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PHONY PEACH DISEASE
PINK BOLLWORM
SOYBEAN NEMATODE
SWEETPOTATO WEEVIL
WHITE-FRINGED BEETLE
WILD COTTON ERADICATION

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COOPERATIVE PEST CONTROL PROGRAMS

Plant Pest Control Branch
Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

CROPS REGULATORY AND CONTROL PROGRAMS

The regulatory and control programs in which the Department participates in cooperation with States, the Republic of Mexico, and Canada fall into three broad categories. These concern (1) incipient infestations of newly-introduced pests which through joint effort may be confined to very small areas or eradicated; (2) introduced pests that have become established over substantial areas in this country and where an effort is made to prevent or retard spread to new areas; and (3) insects native to or generally distributed throughout their ecological or host range in this country which outbreak, periodically, causing widespread damage or destruction of crops in areas often remote from breeding grounds.

The Department's authority for participating in these programs is contained in the following general and specific Federal legislation: The Insect Pest Act of 1905 (7 USC 141-144), the Plant Quarantine Act of 1912. as amended (7 USC 151-167), the Pink Bollworm Act of 1930 (46 Stat. 67), the Incipient or Emergency Outbreak Resolution of 1938 (7 USC 148-148e), the Mexican Border Act of 1942 (7 USC 149), the Department of Agriculture Organic Act of 1944, as amended (7 USC 150-150g), the Insecticide, Fungicide, and Rodenticide Act of 1947 (7 USC 135-135k), the Golden Nematode Act of 1948 (7 USC 150-150-g) the Halogeton Glomeratus Control Act of 1952 (7 USC 1651-1656), and Public Law 518, the Miller Pesticide Residue amendment to the Food, Drug and Cosmetic Act of 1938 (68 Stat. 511).

Responsibility for preventing or retarding the spread of introduced pests into uninfested areas is usually shared by the infested States and the Federal Government. Historically, coastal States, particularly those with extensive sea and airport facilities receiving foreign traffic and States bordering on other countries are most vulnerable to the introduction of new pests. When new species capable of causing severe damage to crops in this country, penetrate the first line of defense which is port-of-entry inspection, the affected States and the Federal Government have jointly-supported programs to eradicate, suppress, or prevent further expansion of infested areas. In many instances such operations are of greatest benefit to the agriculture of noninfested States which cannot, except through their Federal Government, contribute to the programs that protect them. As an example, the golden nematode which currently infests only a few thousand acres on Long Island, New York, is a potentially serious pest of potatoes and tomatoes wherever they are grown in this country. Maine, Idaho, Pennsylvania, California, North Dakota, Colorado, and other States are beneficiaries of this program even though they participate only to the extent of surveys within their own boundaries.

On the other hand, the quarantined States and the growers therein have an inescapable interest in a program of this kind. Where only a part of a State is infested, as in the case of the golden nematode, Hall scale, and others, there may be substantial uninfested areas within their own boundaries exposed to infestation. Furthermore, articles produced for interstate shipment within these infested areas provide revenue for the State of origin. When a regulated commodity is offered for inter- or intrastate shipment to a point outside of a regulated area, it is necessary that a certification be made as to its freedom from the pest if it is to be allowed to

compete freely with commodities produced outside of the regulated area. To this end growers frequently provide material aid in carrying out the provisions of a quarantine. States assist in providing inspectors and otherwise contributing to the program.

As a part of the Department's regulatory and control program, cooperative surveys develop information that is needed to advise growers and others as to the prevalence of insect pests likely to cause widespread damage to crops. Agricultural agencies responsible for disseminating information on crop pests such as the Extension Service, Experiment Stations, State Departments of Agriculture, and other State and industrial organizations that engage in educational activities, rely on this source of information.

The effective control of many major crop pests requires timely treatment on an area-wide rather than an individual property basis. The survey provides a basis for forecasting outbreaks, thus contributing substantially to more effective and less expensive controls. Through the prompt release of information obtained, farmers are warned of impending epidemics and industry has advance knowledge as to where and when large quantities of insecticides will be needed.

The administration of the Federal Insecticide, Fungicide, and Rodenticide Act is an important phase of the Department's regulatory and control responsibility. This legislation provides assurance to farmers and other users of pesticides that the products they purchase can be depended upon to control pests without being injurious to people, useful plants, and animals. The Act protects the public from the sale of worthless or dangerous materials by authorizing the Department to give careful scrutiny, before marketing, to formulas and labeling of pesticides. Samples of pesticides collected from dealers' stocks and importations are checked to determine whether or not they are in compliance with the law. If they are in violation, appropriate corrective action is taken by the Department. Operations under the Act have greatly contributed to wider public confidence in the use of pesticides resulting in substantial savings to crops and livestock.

There follows a brief review of each of the programs of a regulatory or control nature in which the Plant Pest Control Branch is participating.

BARBERRY ERADICATION

History: Stem rust has been recognized as a serious disease of cereal crops in this country since the very beginning of American agriculture. Even before the time of the Revolutionary War farmers observed stem rust in their grain crops and suspected barberry bushes as the source of the disease. Colonial laws had condemned the barberry before the relationship between rust on the barberry and that on grain had been proved.

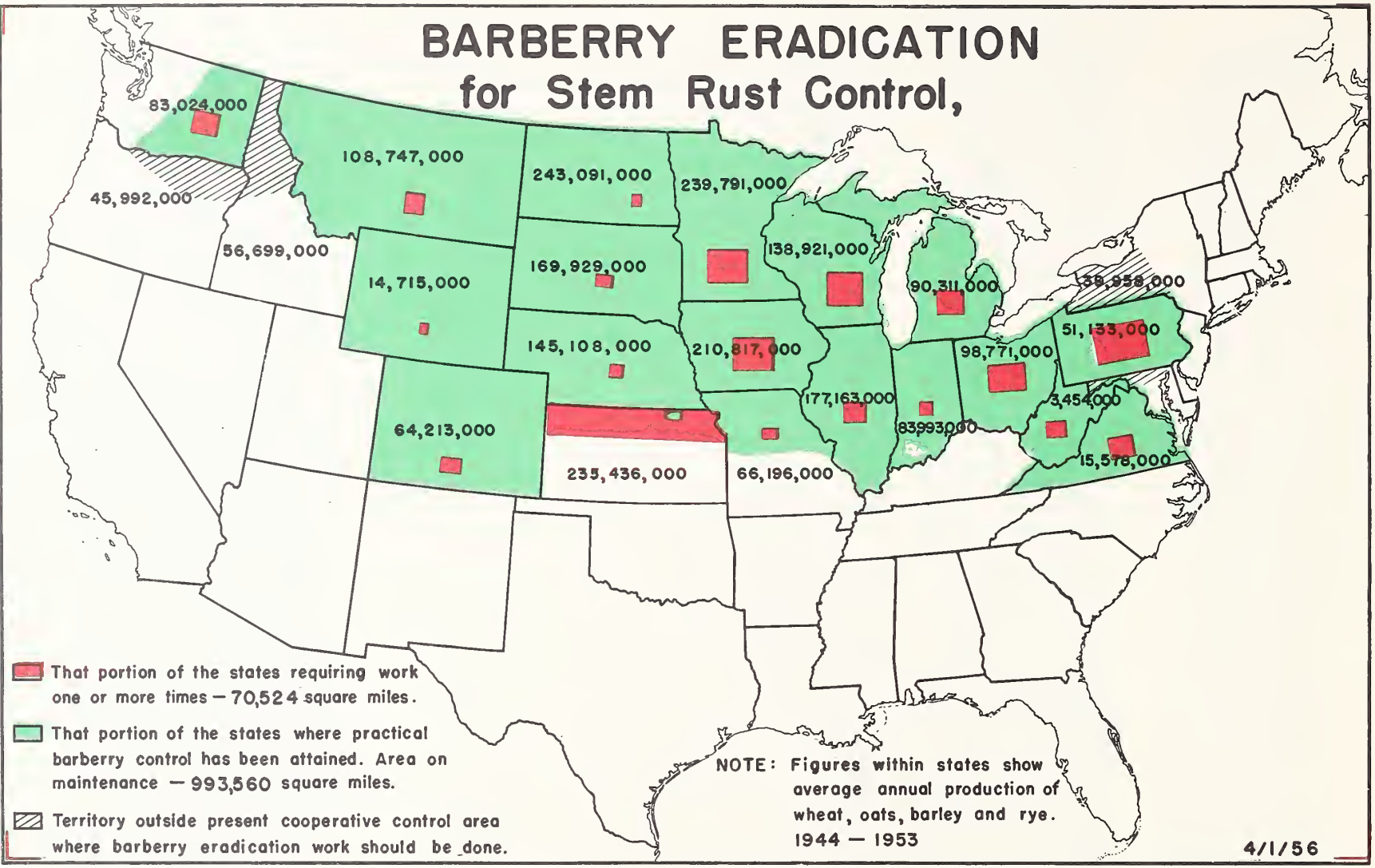
Nature of Disease: Stem rust is caused by a fungus that lives alternately on certain species of barberry and mahonia and on grains and grasses. It is spread between host plants by windborne spores. The rust survives winter temperatures in the black stage on grass hosts and on grain straw. In the spring infection develops on the leaves of the barberry and the disease is spread to grains and grasses. Once rust becomes established in grain fields it spreads from plant to plant and from one field to another until harvest time. As the crops mature the black stage again forms on the ripening straw, thus completing the life cycle.

Quarantine and Control: The organized cooperative barberry eradication project was started in 1918. The objective of the program is to protect small grain from damage caused by stem rust. Rust, coming early as it does from the barberry, often develops into epidemic proportions and causes damage over a wide area before harvest. Races of the rust fungus crossbreed on the barberry and produce new hybrid races that can attack grains previously considered resistant. The eradication program, therefore, serves two purposes: it eliminates the early local sources of stem rust and it destroys the host on which new races of the fungus are produced. The nineteen States participating with the Federal Government in the program produce 2-1/4 million bushels of wheat, oats, barley and rye on 93 million acres each year. These crops represent more than 3 billion dollars of annual income. Stem rust reduces both field production and quality of these crops.

Barberry bushes are killed with ammate applied to the cutoff canes or with sprays of 2, 4-D and 2, 4, 5-T or combinations of the two. The enforcement of Federal and State quarantines prevents the reestablishment of susceptible barberries in areas that have been cleared. Barberry eradication when carried to practical completion will have eliminated, permanently, the source of early stem rust epidemics and the important source of new races. Losses from stem rust may still occur as a result of airborne spores that are blown in from Mexico and southern Texas where barberry is not a factor in the life cycle of the fungus. However, as millions of barberry plants have been eradicated in the 19 control States, the epidemic years have become less frequent.

Of the 1,064,084 square miles in the 19 States originally requiring work, 993,560 have been completed and are now considered barberry-free. Within this area nearly one-half billion rust-spreading barberry plants have been destroyed on 149,318 properties.

BARBERRY ERADICATION for Stem Rust Control,



U.S. DEPARTMENT OF AGRICULTURE

BURROWING NEMATODE

History: The burrowing nematode was discovered on banana roots in the Fiji Islands in 1890 and has since been reported in Jamaica, the Hawaiian and Philippine Islands, Formosa, South India, Dutch East Indies, Java, Brazil, Central America, and Puerto Rico. It is believed to have existed in Florida for at least 30 years. This is the only State with an established infestation in citrus.

Nature of Pest: The burrowing nematode lives in roots of trees and other plants in tropical and subtropical regions and completes its life cycle in about 30 days. The female deposits eggs inside rootlets of trees or other plants. The larvae feed on the roots and as the food supply is exhausted, they spread to other roots. Infestation is thus extended radially about 50 feet each year. These nematodes have been found in citrus roots as deep as 12 feet.

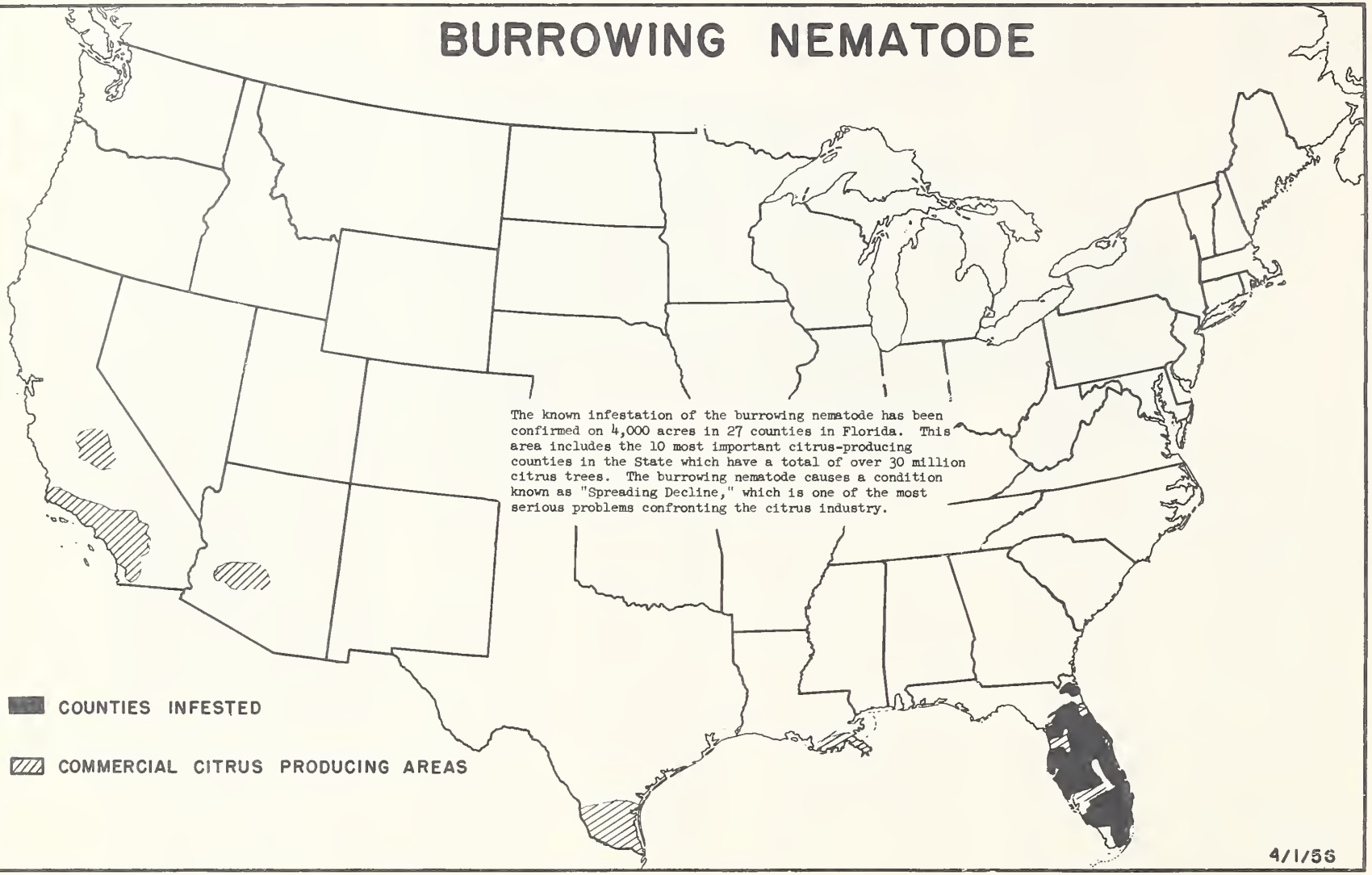
The burrowing nematode stunts citrus and avocado trees and results in undersized fruit. This condition is called "spreading decline." More than 110 species of plants, including ornamentals and weeds, are suspected hosts. These host plants, while showing little damage from the pest, serve as nematode carriers. More than 6,000 acres, or about one percent of Florida's citrus acreage, are now known to be affected by "spreading decline." If not controlled, an estimated 44,000 acres could be affected by 1965. More than 260 nurseries are now infested, but regulatory measures affect the movement of nursery stock.

Quarantine and Control Program: Control measures administered by the State Plant Board of Florida include (1) surveys to delimit areas of infestation; (2) enforcement of State regulatory measures regarding infested nurseries, including supervision of the hot water treatment of citrus nursery stock; and (3) removal and destruction of infested trees and plants, and treatment of soil with fumigant.

Objectives: Branch program objectives are: (1) To assist the State Plant Board of Florida in detecting infestations; (2) supervise measures regulating movement of nursery stock to prevent spread of the pest; and in carrying out measures to free nurseries of the nematode; and (3) establish whether the disease is present in other citrus-growing areas of the country.

As of February 1956, infestations had been found on 222 properties, including 111 groves, 69 nurseries, and 42 miscellaneous plantings. Branch laboratory personnel have examined 72,117 samples, 4,706 of which were positive determinations. Five hundred acres of infested groves had been treated in the State's tree removal and treatment program--an emergency measure which is being used pending further research developments. This procedure calls for the removal of all citrus trees affected, plus four additional trees in all directions, and fumigation of the soil with D-D at 600 pounds per acre. To combat spreading decline in other citrus-producing States, the Branch is currently making surveys in California and Texas. Similar surveys are scheduled for Louisiana and Arizona.

BURROWING NEMATODE



U.S. DEPARTMENT OF AGRICULTURE

CITRUS BLACKFLY

History: The citrus blackfly is of Asiatic origin. It was found in Mexico in 1935 on the West Coast and from this point it has spread rapidly along both the East and West Coasts toward the citrus-producing areas of Texas, Arizona and California. On the west coast of Mexico it has not been found north of Hermosillo, Sonora, but it is now prevalent in all citrus-producing sections of northeastern Mexico. During 1955 six infestations at four locations were discovered in the Lower Rio Grande Valley of Texas.

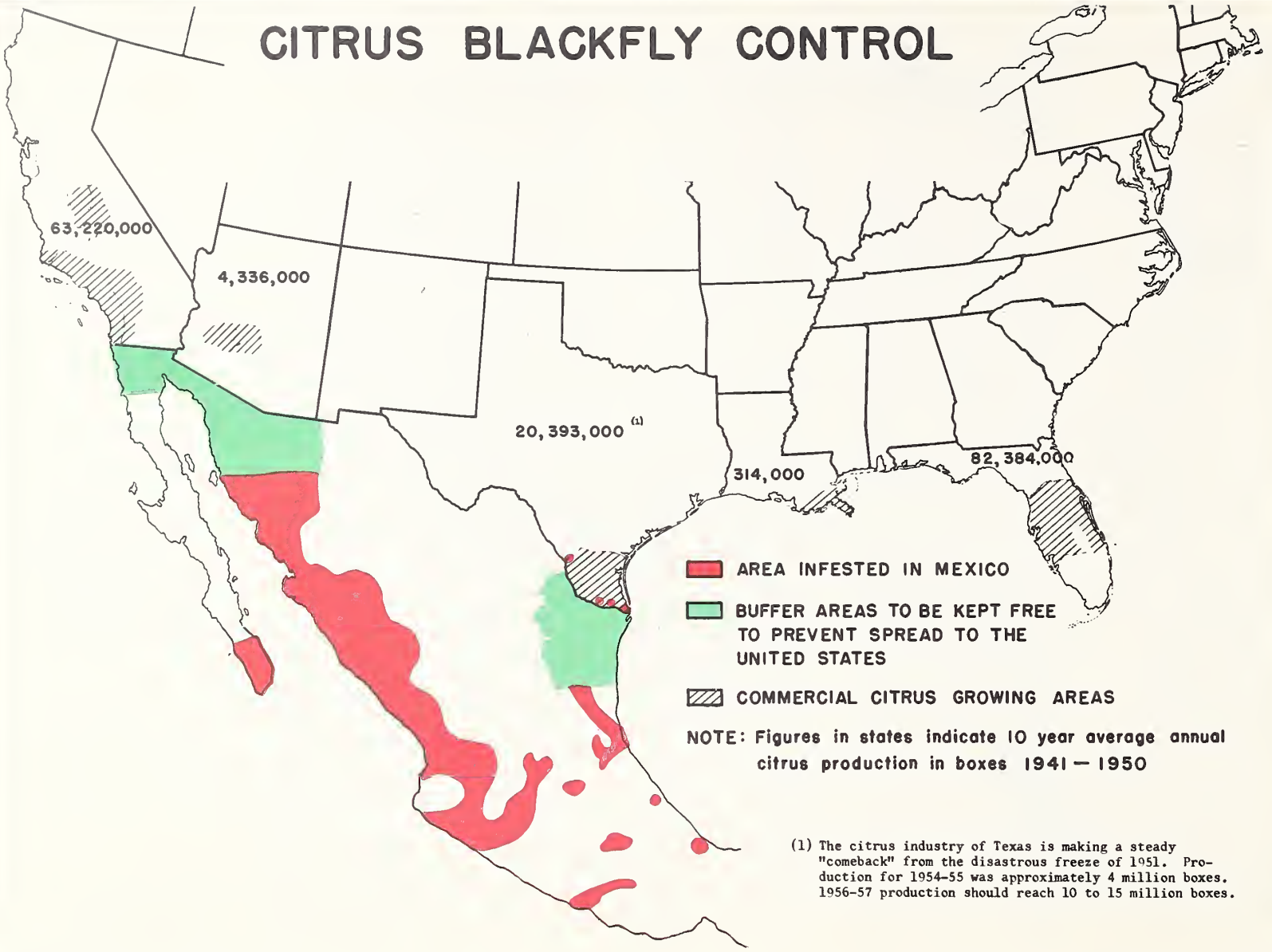
Nature of Pest: The citrus blackfly is primarily a citrus pest and a very serious one. This insect can reduce a citrus tree to a stage of unproductiveness more quickly than any other citrus pest known today. It spends most of its life in a stationary, scale-like form with its beak imbedded continuously in the leaf tissue, almost completely stifling the vitality and productivity of the tree. A two-year uncontrolled infestation has been known to cause a total crop failure. The citrus blackfly has caused very severe damage to citrus plantings in Mexico and it could be equally as destructive and very expensive to control if allowed to become firmly established in the citrus-producing areas of the United States.

Quarantine and Control: Citrus blackfly surveys have been conducted in northern Mexico since 1949 by the Plant Pest Control Branch in cooperation with the Mexican Department of Agriculture. The objective is to locate and eradicate infestations before eradication becomes impossible. The Mexican Department of Agriculture applies all the control measures and enforces quarantines in the States adjoining the international border. Excellent eradication results have been achieved and many infestations have been eradicated in northern Mexico.

There is no Federal quarantine against the pest; however, an eradication campaign was established immediately after the finding of six infestations between Brownsville and Laredo, Texas. The eradication sprays were applied by the Texas Department of Agriculture consisting of three applications of an oil-rotenone formula with 21-day intervals between sprays, and it is believed the infestations have been completely eradicated. Surveys are still in progress in the Lower Rio Grande Valley of Texas. Citrus trees must be examined almost leaf by leaf. Although it is possible to eradicate an infestation, others will probably become established because the insect can be spread easily from one location to another by flight, by movement of infested nursery stock and by vehicles.

Present indications are that the citrus blackfly can be kept under control by chemical and biological methods.

CITRUS BLACKFLY CONTROL



(1) The citrus industry of Texas is making a steady "comeback" from the disastrous freeze of 1951. Production for 1954-55 was approximately 4 million boxes. 1956-57 production should reach 10 to 15 million boxes.

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ECONOMIC INSECT SURVEY

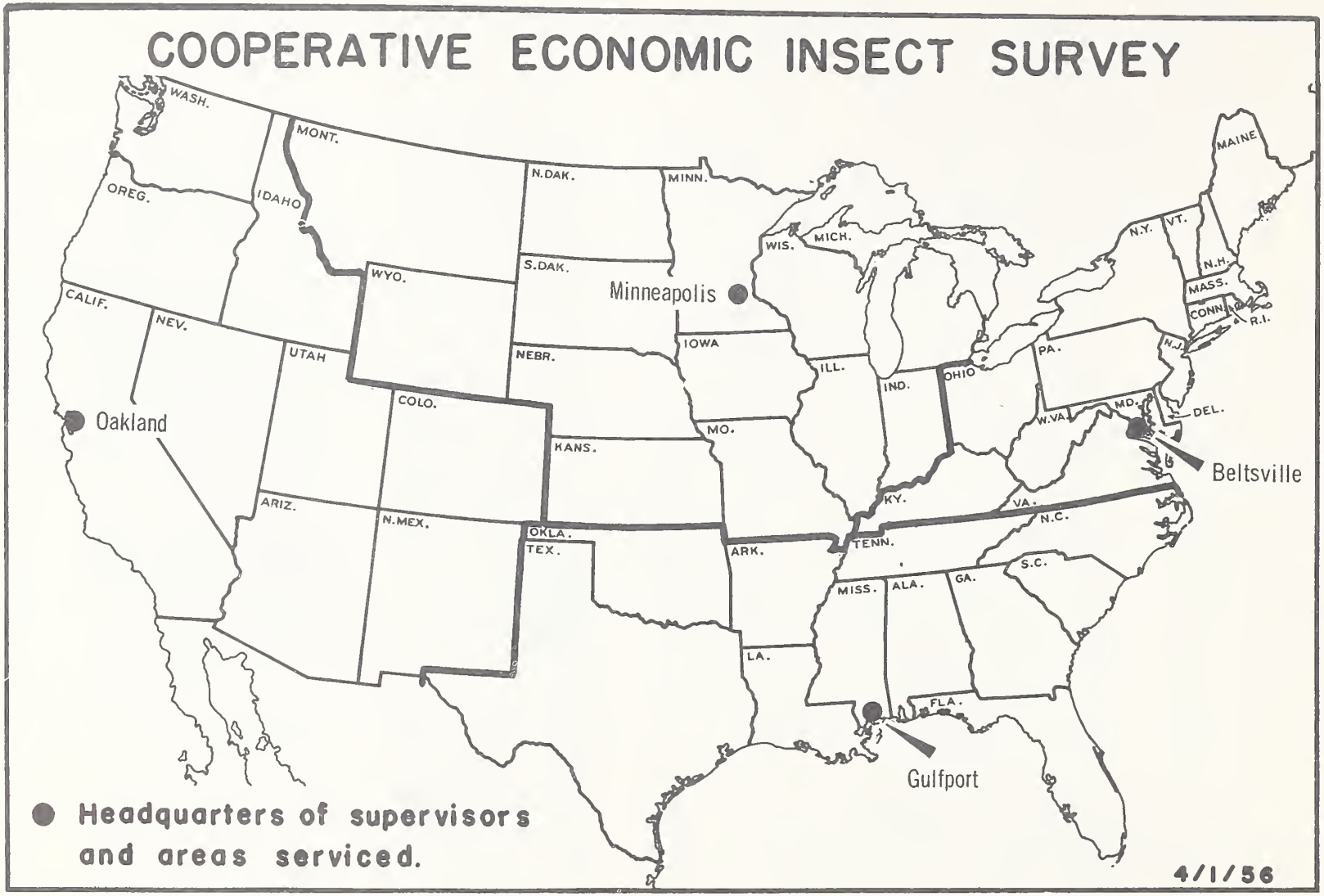
Survey to determine the abundance and incidence of insects and related pests of economic importance was organized on its present basis in 1952. The program is national in scope but founded on cooperation with the States. The nation has been divided into four areas, each of which is supervised by a Survey Entomologist.

Nature of Survey: The insect pest survey, which preceded the present program, was organized in 1921 when a group of entomologists volunteered to contribute to a monthly report to be issued by the U. S. Department of Agriculture on incidence of pests. In 1950, the Civil Defense Administration asked USDA to use its facilities to combat possible intentional introduction of insects and diseases of livestock, crops and forests. In response the Bureau of Entomology and Plant Quarantine in 1951 inquired of various State agricultural agencies as to the possibility of setting up a "clearing house" or central point for screening insect specimens and reports in each State. The suggested program led to development of the present cooperative survey organization. In 1955, over 600 entomologists contributed to the program.

From 1951 to 1953, the reports were on a voluntary basis. In the spring of 1953, the Plant Pest Control Branch entered into a program whereby the Branch and State agricultural agencies would jointly finance the services of one survey entomologist in each of the cooperating States. Such a program is now in effect in 25 States but a large volume of the information on insects still is obtained through the efforts of entomologists who receive no pay for their reporting services.

Objectives of Survey: (1) To assist farmers and agricultural workers to protect crops by supplying current information on insect activity; (2) to aid manufacturers and suppliers of insecticides and equipment to determine where supplies are needed; (3) to aid and assure prompt detection of newly-introduced insects; (4) to develop a workable insect pest-forcasting service; (5) to develop nationwide uniformity in reporting insect conditions; (6) to determine losses by insects; (7) to maintain records on occurrence of domestic and foreign economic insects; and (8) to provide a nationwide organization for biological warfare defense as it relates to insects.

How it Operates: Information on occurrence and abundance of insects is collected by field entomologists and forwarded to the State clearing house. The State makes immediate use of the information for local farmers and industry. The information is summarized and forwarded to the Plant Pest Control Branch for inclusion in the weekly Cooperative Economic Insect Survey Report which is mailed to over 2600 persons concerned with pest control. A permanent insect information file is also kept and it now contains over a half million notes on over 24,000 domestic species and 20,000 foreign species of insects. These records are open for use by the public, by Federal and State agencies and individuals.



U. S. DEPARTMENT OF AGRICULTURE

EUROPEAN CHAFER

History: The European chafer was found for the first time in this country in western New York State in 1940. It is thought to have been brought here earlier with plants from France. It is now known to occur in seven counties in western New York and in one county each in the States of Connecticut and West Virginia.

Nature of Pest: The yellowish-brown beetles emerge from the soil each day at dusk during June and July and "swarm" about trees and shrubs with a buzzing noise, but feed sparingly, if at all. The larvae, or white grubs, feed on roots of plants, often damaging pastures, turf, hay crops, alfalfa, small grains and other plants. Its destructiveness threatens agriculture in non-infested areas.

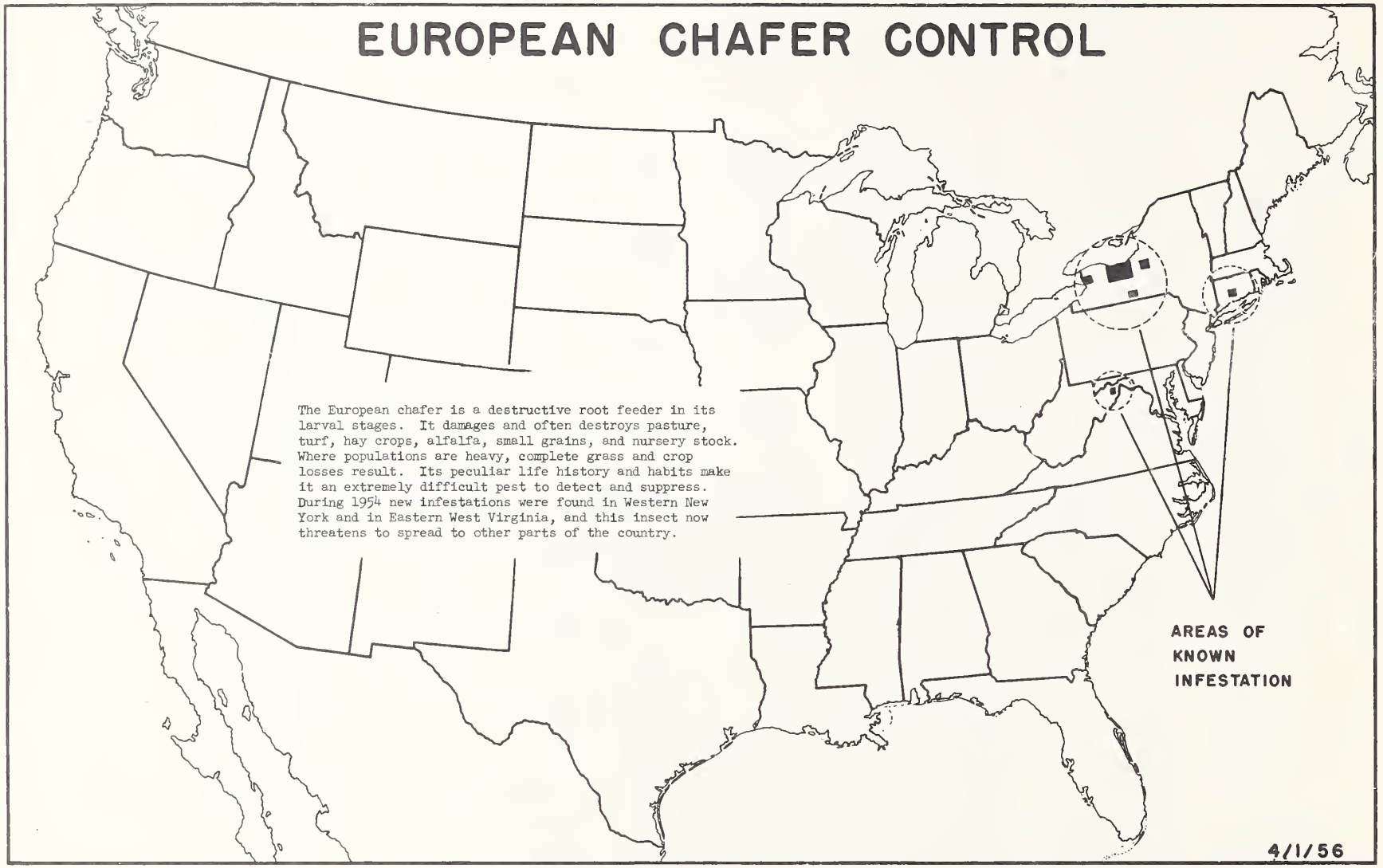
Quarantine and Control: From 1942 to September 1955, the New York Department of Agriculture and Markets had the responsibility for carrying out regulatory procedures governing the movement of articles from infested areas. Much of the related research was done by the New York State Experiment Station and State agencies did most of the survey work in that State. Federal regulatory and research agencies functioned largely in an advisory capacity in New York and arranged cooperative surveys elsewhere.

The program was strengthened in 1955 by a Federal quarantine which became effective in September of that year. The Federal regulations apply in parts of western New York and to a county in Connecticut and one in West Virginia. Earlier in 1955 Federal funds were used to assist in regulatory work, scouting and control in the infested areas, and special cooperative surveys in 19 States. Grub-adult mounts and literature about the chafer were distributed to all State plant pest control officials so that they could aid in the cooperative survey.

No new infestations were reported in 1955 outside of the areas under Federal quarantine. Eradication soil treatments were applied on a Federal-State cooperative basis to all isolated infestations in New York, Connecticut, and West Virginia. From September through December regulated articles valued at more than $6,000,000 were certified for shipment from the New York State regulated areas. Cooperating States have made substantial contributions in services and funds for regulatory, survey and control work. Regulated industry has spent large sums for quarantine compliance.

Research is under way to develop soil and plant treatments necessary for quarantine compliance and an effort will be made to develop a more effective trap with sex, sound, or light attractants. This latter development is needed for dissemination surveys outside the known infested areas, and to determine the degree and extent of spread in the areas under regulation.

EUROPEAN CHAFER CONTROL



U.S. DEPARTMENT OF AGRICULTURE

FOREIGN TECHNICAL ASSISTANCE PROGRAM

History: The Plant Pest Control Branch since July 1954 has assisted the United States Operations Missions of the International Cooperation Administration and the governments of cooperating countries abroad in the development of practical insect control programs in Lebanon, Iran, Pakistan, Iraq, and Libya. Prior to 1954, this program was known as the Regional Locust Control Program and was administered cooperatively by the State Department, the Foreign Agricultural Service and the Bureau of Entomology and Plant Quarantine. The program is filling an important need in the foreign technical assistance program.

Objectives: The objectives of the Foreign Technical Assistance Program are: (1) To assist the U. S. Operations Missions in their efforts to aid the governments of cooperating countries in the development and direction of practical control programs against major insects; (2) to maintain facilities and services for a coordinated locust control program in the Near East, Africa, and South Asian Countries; (3) to train train nationals in aerial application of pesticides; (4) to aid the USOM in developing coordinated insect control programs in the various countries, and to coordinate ICA insect control activities involving cooperation with international and other organizations.

Progress: Because plant protection organizations in the countries currently involved are becoming increasingly conscious of their responsibilities in pest control, they are demonstrating their willingness to cooperate and make improvements. Additional countries have requested assistance in pest control, as reflected in part by FAO's expanding operations to include the Senn Pest, Moroccan locust, and the South American migratory locust.

The program's operating costs have decreased considerably from year to year since cooperating countries now furnish their own pilots, planes and pesticides. The Plant Pest Control Branch now operates in more countries, has a bigger staff of technicians, and is conducting a much broader program than was the case two years ago.

Accomplishment: Some idea of accomplishments under this cooperative program may be gained from the following facts and figures: At least 75 different insects have been considered in the planning of control measures and in demonstrating insecticidal applications. One country alone used 17 different insecticides, and more than 380 tons of pesticides were used in the over-all program. New equipment, including 40 spray planes, 67 trucks, 241 power sprayers and over 7,000 hand-operated units were imported by cooperating countries. Fifty-two pilots were trained for aerial spraying and dusting, 19 mechanics for spray plane maintenance and 112 men received training as plant protection officers. Since 1951 a steadily increasing number of trainees in entomology and several heads of plant protection departments have come to the United States for training. More difficult to assess in their full value are the many intangible accomplishments of the program, such as increased country-to-country cooperation and better international relations.

FOREIGN TECHNICAL ASSISTANCE PROGRAM

GOLDEN NEMATODE

History: The golden nematode, Heterodera rostochiensis Woll., was first discovered in 1941 in Hicksville, Nassau County, Long Island, N. Y. Present infestation is confined to Nassau and Suffolk Counties of Long Island.

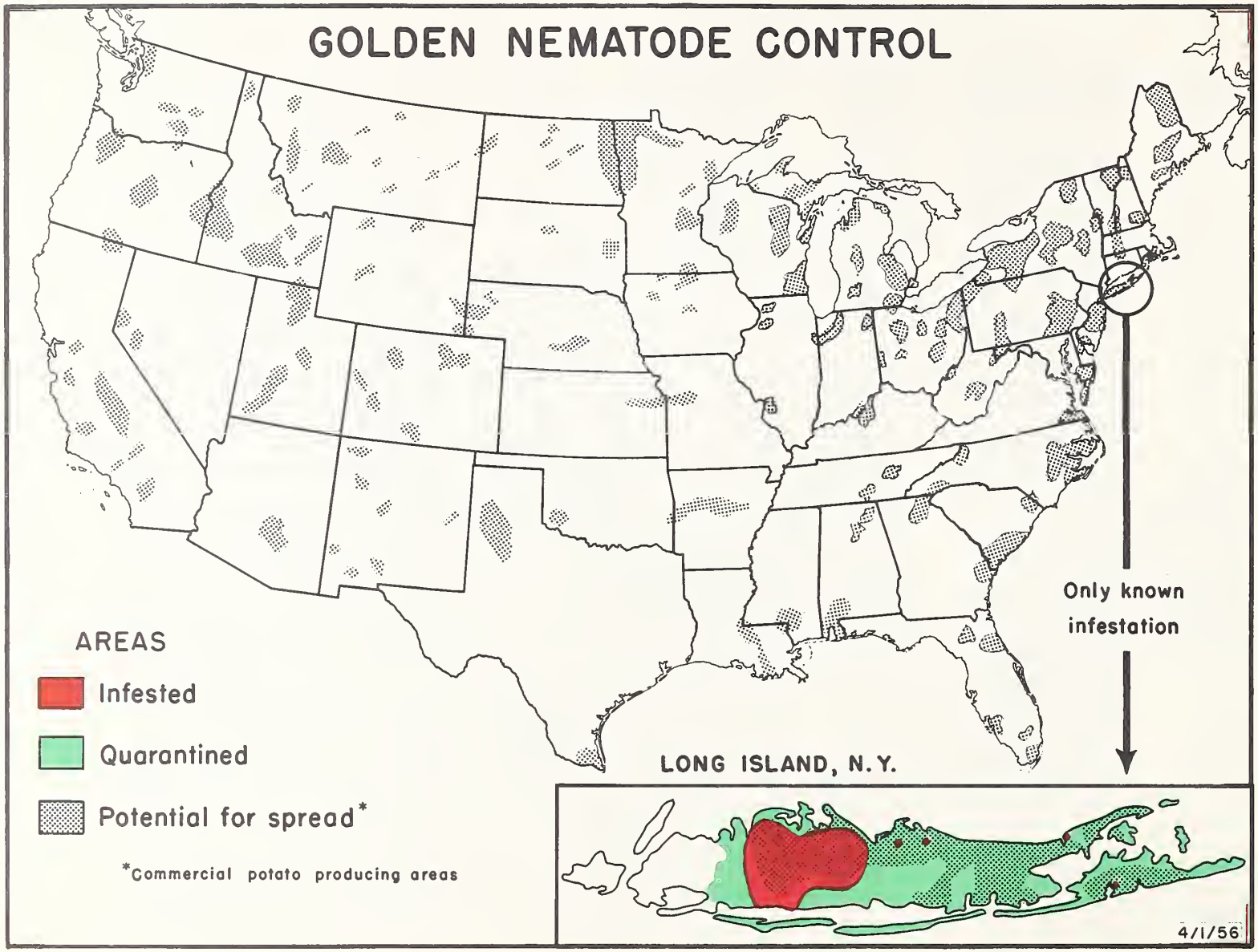
Nature of Pest: Eggs and larvae of the golden nematode pass the winter in a thick-walled, protective cyst. In the spring, in the presence of host plants, the eggs hatch and the larvae attack the roots. After penetrating the root the larvae undergo a series of changes, the males moving freely, the females becoming more or less stationary. The female body enlarges and breaks through the outer layer of the root. After fertilization it continues to enlarge and becomes a protective cyst encasing eggs and larvae of the next generation.

Potatoes, tomatoes and eggplants are the only hosts of economic importance. This nematode injures the root system and causes stunting and dying of plants and reduced crop yield. On Long Island nematologists have found up to 85 percent reduction of potato yield on heavily infested land.

Quarantine and Control Program: The objective of the program is to prevent spread of the organism and reduce cyst populations on presently infested lands. The New York State Department of Agriculture and Markets, aided by the Division of Nematology, Bureau of Plant Industry, Soils and Agricultural Engineering, ARA, conducted annual surveys which by 1944 disclosed infestation of 1,238 acres of potato lands. Cooperative survey operations begun in 1945 in Nassau and Suffolk Counties have continued and as of December 31, 1955, infestation has been found on 304 properties covering 12,722 acres. Since 1947 the Plant Pest Control Branch has conducted soil-sampling surveys in important potato-producing States in cooperation with the States concerned. These surveys are now conducted in each area once every three years. No established infestation of golden nematode has been found outside Long Island.

Current Operations: There is no Federal quarantine but a New York State quarantine was established in 1944. The regulated area includes all of Nassau and Suffolk Counties. The Branch cooperates with New York and other States in making surveys. Surveys are conducted annually on Long Island and infested land is removed from host crop production. Regulatory measures govern movement to other parts of Long Island or elsewhere in the country of materials or equipment likely to be contaminated. Since golden nematode continues to be a threat to the potato and tomato industries, survey, quarantine, and control measures in New York State will be continued in cooperation with the State Department of Agriculture and Markets. Nationwide surveys will also be made every three years. A field test fumigation program is being tried to determine if golden nematode infested land can be returned to potato production.

GOLDEN NEMATODE CONTROL



GRASSHOPPERS AND MORMON CRICKETS

Grasshoppers and Mormon crickets are native to the United States. Grasshoppers are generally distributed throughout all States but are recurrently most severe in the midwestern and western States. Mormon crickets occur in the western part of the United States.

Nature of Pest: The Mormon cricket and most species of grasshoppers hatch during the spring months from eggs deposited in the ground the previous season. The nymphs develop into adults during the summer months. The adults deposit their eggs in the ground in the summer and fall and then die.

These pests are general feeders on cultivated crops and/or range grasses. Each of these insects, in outbreak proportions, is capable of full destruction of the plants. In many areas even light populations can cause severe damage. Although grasshopper populations were comparitively low during most of the period 1942-1953, annual losses to grain and hay were estimated at $9,500,000 and the range and pasture forage at $89,400,000 during those years.

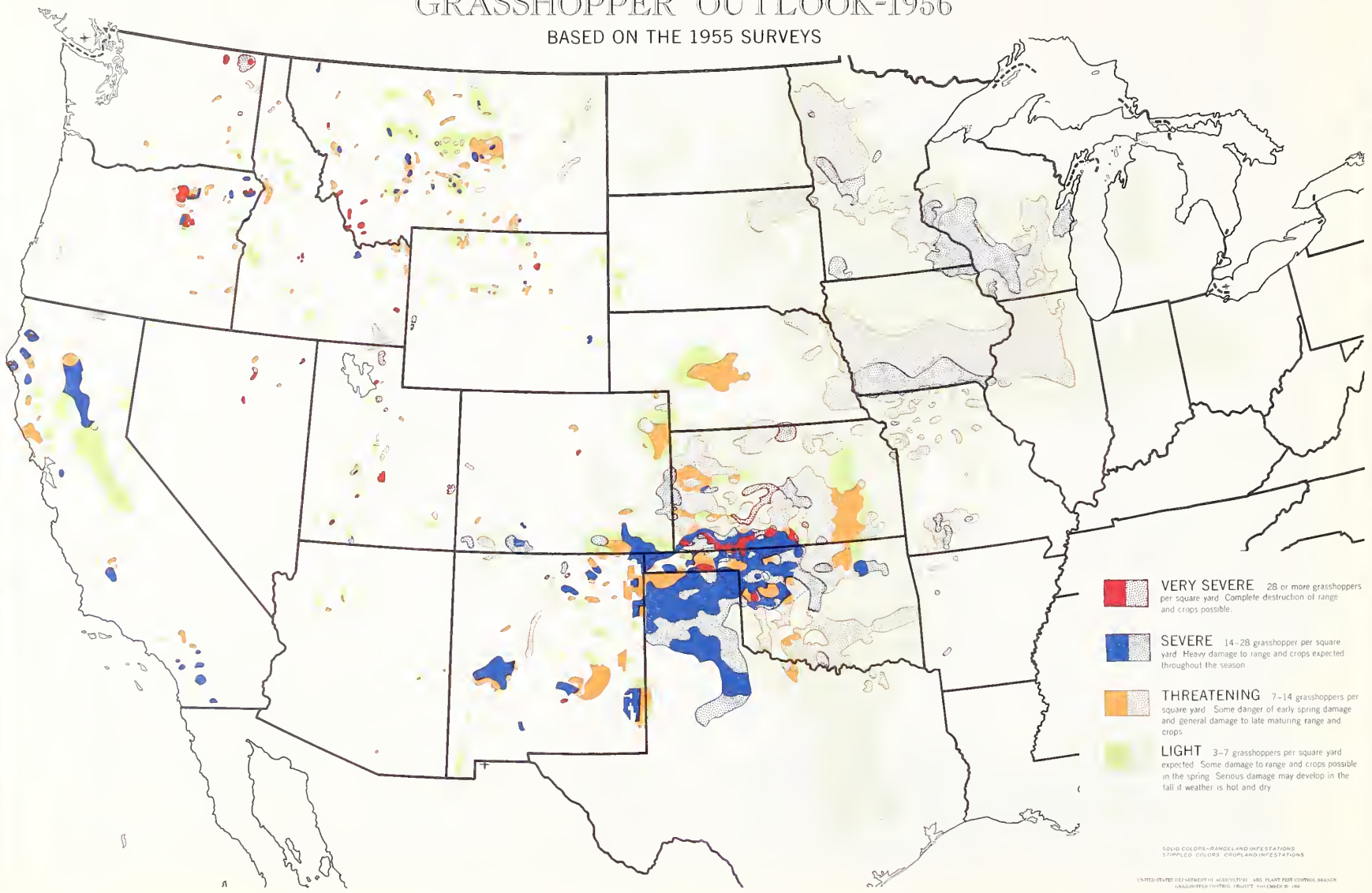
Control Program: The first well-organized grasshopper control program involving Federal participation was initiated in cropland areas in the midwestern States in 1934. Poisoned bait was used to kill grasshoppers and was spread by hand or by various homemade mechanical spreaders. In later years more effective control was achieved through the use of new insecticides and more efficient bait mixing and spreading facilities. Bait is still used today to control the Mormon cricket and, in a few instances, farmers prefer it for small grain protection against grasshopper attack. Grasshopper infestations in general are now effectively and economically controlled by insecticides applied as a spray by ground equipment or by airplanes.

The immediate objective of the control program is to destroy infestations of grasshoppers and Mormon crickets before they can seriously damage current season's planted and range crops. The long-range objective is to prepare farmers and ranchers to take local action to control these pests before they build up to outbreak proportions. Branch personnel provide technical leadership and direction in evaluating the problem, planning and executing control and determining results. The work falls into four main categories: (1) Continuing surveys to locate and evaluate infestations; (2) participation in control of infestations on low-value public and private rangelands, particularly when migratory species are involved and there is danger of spread over wide areas and when local facilities are inadequate to handle the problem; (3) control on Federally-owned land in cooperation with Federal land-managing agencies; and (4) provision of technical assistance and program services to farmers who finance crop-area control.

Program activities are conducted cooperatively with the States, Federal agencies, rancher and farmer groups, and agricultural organizations participating.

GRASSHOPPER OUTLOOK-1956

BASED ON THE 1955 SURVEYS



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GYPSY MOTH

The gypsy moth, a native of southern Europe, Asia, and north Africa, was introduced into Massachusetts from Europe about 1869. The generally infested area now includes New England and eastern New York.

Nature of Pest: The adult female moth deposits about 400 eggs in a single cluster in July or early August. The insect overwinters in the egg stage. Hatching occurs in early May and the caterpillars, which are voracious feeders, inflict severe damage and mortality by defoliating trees and shrubs. After attaining full growth by mid-June the caterpillars change into pupae and about two weeks later adult moths emerge. The male moth is a strong flyer but the female is incapable of flight and dies soon after deposition of eggs. The adult moths take no food.

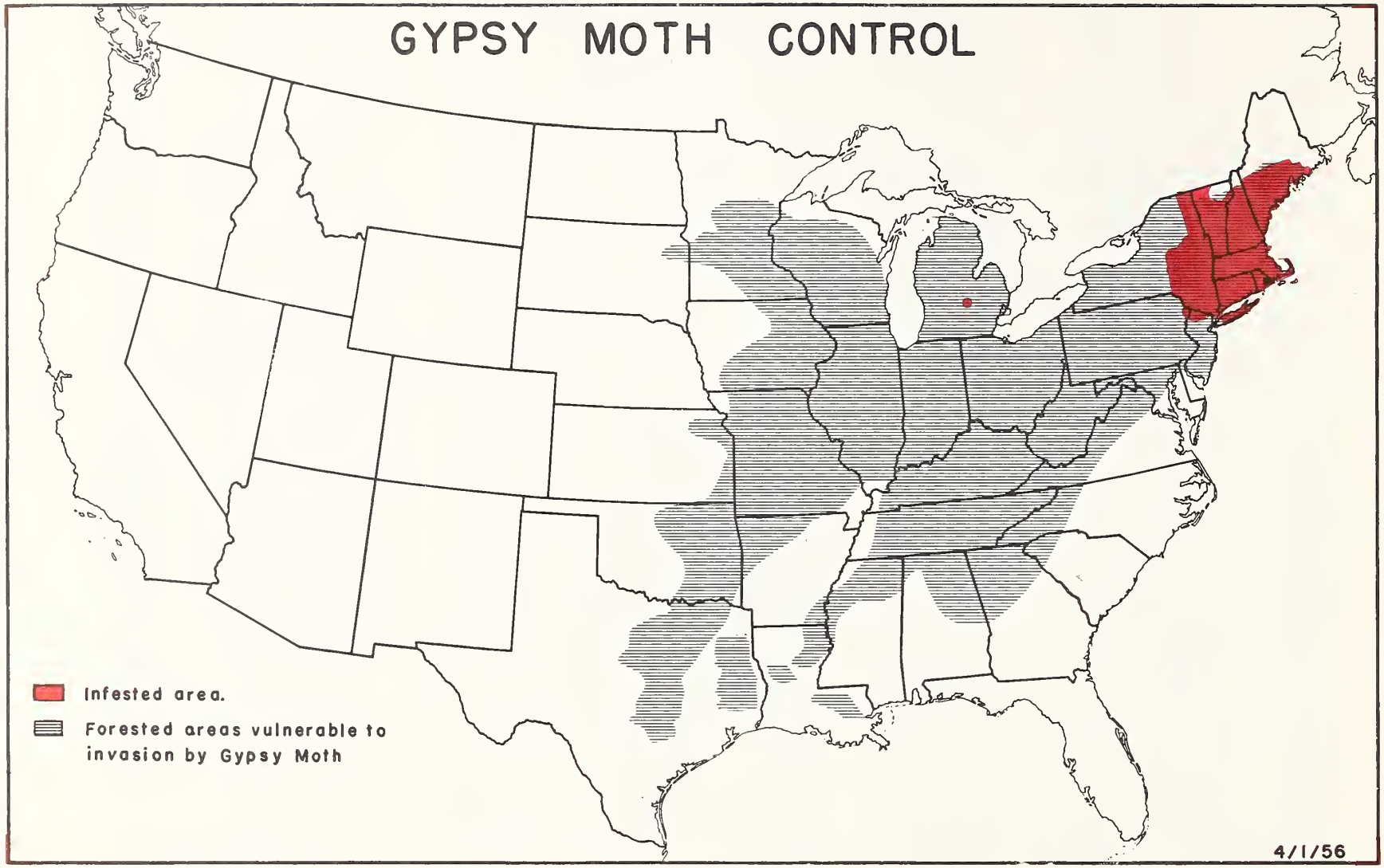
The gypsy moth is a serious pest of deciduous trees and shrubs and evergreens are attacked under outbreak conditions. When outbreak conditions develop, feeding results in defoliation of extensive forest areas involving thousands of contiguous areas. The greatest potential for economic loss occurs in uninfested areas west and south of the presently infested region where more than 100 million acres of susceptible hardwood forests are present.

Quarantine and Control Program: The objective of the program is to prevent further spread of the pest and to prevent damaging outbreaks within the generally infested area by the enforcement of Federal and State quarantines, surveys to detect new infestations, the application of sprays to eradicate outlying and peripheral infestations, and by technical assistance to States. Interstate movement of forest and quarry products and other commodities is regulated under a Federal quarantine and intrastate movement under parallel State quarantines. Westward spread of the insect was slow and notable progress was made in halting further spread between 1923 and 1948 when intensification of control work confined the western periphery of the generally infested area to the western edge of New England. Following the hurricane of 1938, infestation was found scattered throughout eastern New York and evidence is strong that broken fragments of egg masses were carried there by the winds. This extensive spread was followed by the worst gypsy moth outbreak on record from 1952 to 1954 and further spread occurred as a result of wind dispersal of small larvae in a westerly direction.

Sex-attractant traps are used extensively in current survey operations in determining distribution of the pest and for checking efficacy of control operations. Outlying and peripheral infestations are sprayed by aircraft using DDT at the eradication dosage of one pound in one gallon of spray per acre. Outbreak conditions within the generally infested region are brought under control with even lighter dosages of DDT. There is immediate need for intensification of regulatory and control activities along the periphery of the general infestation to prevent further spread.

Program operations are conducted in cooperation with pest control agencies in States involved. Survey and control activities are conducted in all areas under authority of applicable plant pest laws of the States involved.

GYPSY MOTH CONTROL



U.S. DEPARTMENT OF AGRICULTURE

HALL SCALE

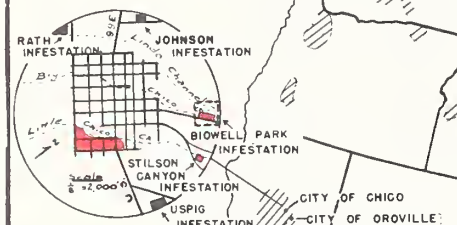
History: Common throughout the Middle East, Hall scale was first found in the Western Hemisphere in 1934 infesting stone fruits in the experimental plantings of the U. S. Plant Introduction Garden, Chico, California. However, it apparently had been introduced into California about 1911 or 1912 from Chinese and Russian Turkestan. Present infestations are limited to three California areas involving eight infestations. In the immediate area of scale infestation are 35,662 acres of deciduous fruit in Butte and Yolo Counties.

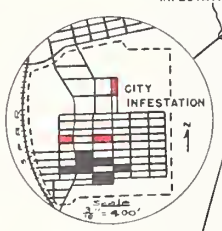
Nature of Insect: Little is known of this very prolific diaspid scale. It is so minute that 2,000 individual specimens have been found on a single almond hull. One and a partial second generation occur between the time the first crawlers emerge in late March and the middle of October when the scale is found on all parts of the host. The scale enters into the deep bark fissures of the tree damaging fruiting wood and current growth and malforming fruit. Up to 25 percent loss of fruit may result. If this pest were allowed to become established in California some 385,000 acres of deciduous fruit in California, valued at $228,000,000, would be subject to infestation. Spread from California would endanger the thousands of acres of stone fruit throughout the country.

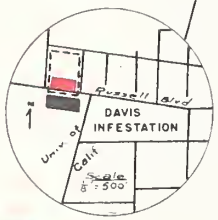
Quarantine and Control: The objective of the program - to locate and eradicate Hall scale from all existing infestations - is being realized by the enforcement of State regulations regarding the movement of plant material, by survey of host-growing areas, and fumigation or removal of infested trees. When Hall scale was discovered in the U. S. Plant Introduction Garden at Chico in 1934, the California Department of Agriculture started eradication procedures but scale was again found in the Garden in 1940 and from there it spread to a nearby large commercial orchard. The State of California then joined forces with the United States Department of Agriculture to form a cooperative project of eradication. An extensive survey made in California and other western States and in Gulf Coast States which have a climate similar to that in which scale is found revealed eight localized infestations centering in the vicinity of Chico, Oroville, and Davis, California.

Normal spray programs are not completely effective. However, the use of hydrocyanic acid gas in three consecutive fumigations has been found effective in obtaining complete mortaility of the scale. Removal of hosts and fumigation have finally eradicated the original U. S. Plant Garden infestation. At present all infestations have been fumigated with the exception of one area in Chico which is now receiving treatment. Infested areas are undergoing delimitation surveys and properties which have been fumigated are being inspected periodically. Under the current rate of progress all fumigation activities will be concluded by the winter of 1957 but host inspections will continue for three years subsequent to final treatments when eradication of this pest will be complete. The California Bureau of Entomology, and its agencies, and the USDA Plant Pest Control Branch cooperate in this program.

HALL SCALE ERADICATION







CITY OF CHICO
CITY OF OROVILLE
CITY OF DAVIS

CURRENT HALL SCALE INFESTATION

INFESTATION ERADICATED

TREATMENT AREA BOUNDARY

Stone Fruit Producing Areas

4/1/56

JAPANESE BEETLE

History: As the name indicates, the Japanese beetle is of oriental origin. It was brought to New Jersey with plants from Japan prior to 1916 and is now found in parts of coastal and adjacent States from Maine to North Carolina with some spotted infestations outside this area as far west as Ohio. The infested region equals about six percent of the area of the United States.

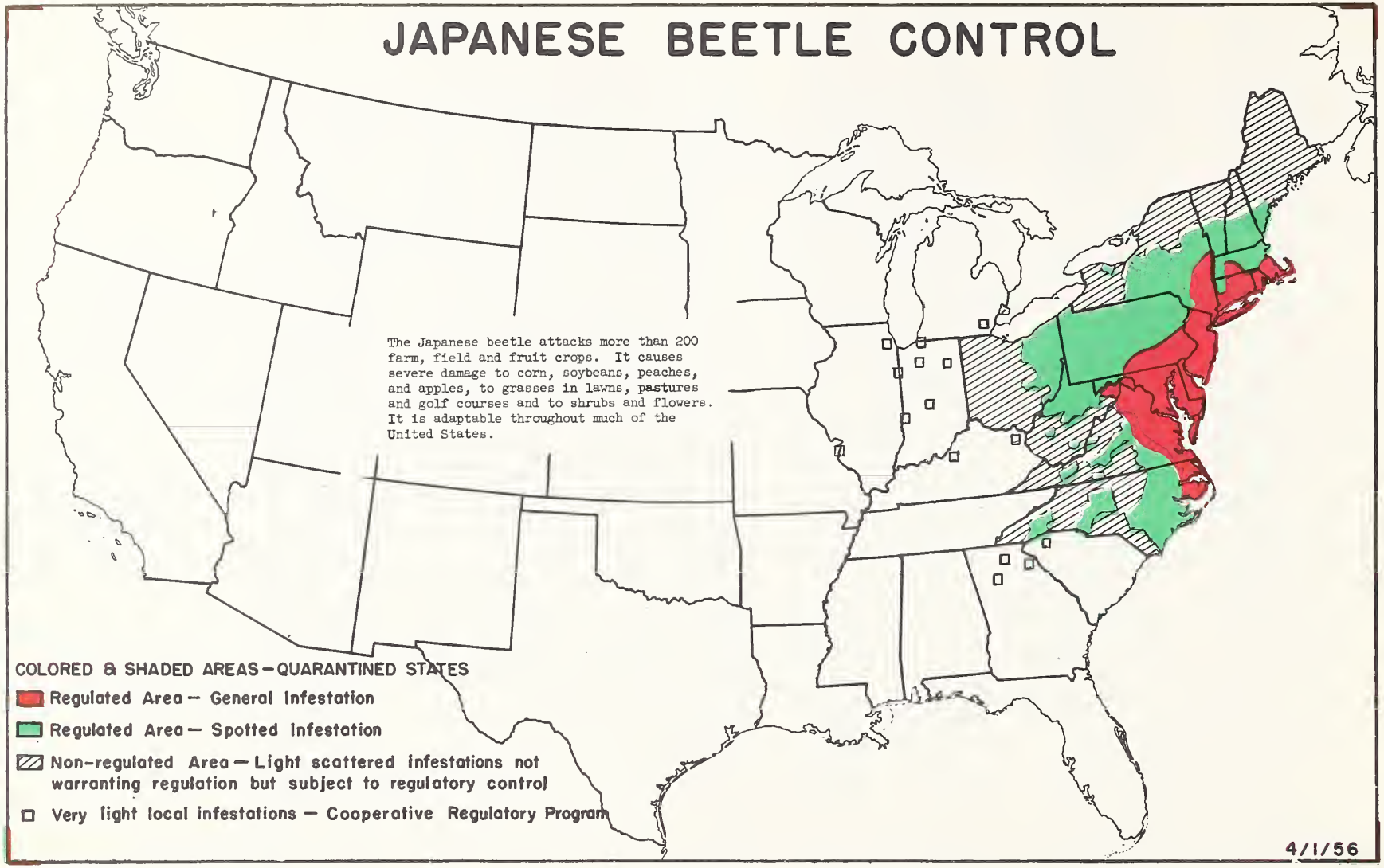
Nature of Pest: The beetle lives in the soil as a white grub for about 10 to 11 months. The adult, which emerges in early summer, is about one-half inch long, of a brilliant metallic green or bronze color with coppery-brown wing covers and the abdomen is marked by a row of white spots. The female beetle lays eggs in the soil. The adults are most numerous in July and disappear by September.

The beetle attacks more than 200 agricultural and ornamental plants, causing damage of around $10 million annually. In summer the adult beetle, which lives about 30 days, feeds on and skeletonizes the leaves of peaches, apples, small fruits, corn, soybeans, ornamentals and other plants. The root-feeding grub is responsible for extensive damage to turf in pastures, lawns and golf courses. When once established, control of the Japanese beetle by insecticides or biological controls is a slow, difficult and costly process. For this reason Federal-State regulatory controls have been put into effect to protect uninfested areas.

Quarantine and Control Program: In force since 1919, the quarantine and control program provides safe, effective, and economical compliance procedures with a minimum of interference to regulated industry, commerce, and the public. These regulations apply to the District of Columbia, all of seven, and parts of eight Atlantic coastal and adjacent States. In 1955 the Plant Pest Control Branch certified for shipment regulated articles valued at $22 million, provided DDT aerosol treatments for 15,000 plane flights, and applied DDT foliage treatments to 57 infested airfields. The Branch also did some scouting in all non-quarantined States and made a few first-record collections and some re-collections of specimens. Eradication-suppression soil treatments were applied to 11,500 acres at 37 non-regulated locations in 10 States - the largest acreage treated in a single year. The newer method of applying dieldrin by plane was used in most cases because of its economy and effectiveness.

The operation of this program under Federal leadership, combined with Federal research, has provided a practical and successful method of controlling this pest. To increase effectiveness of quarantine and control, continued cooperative research is necessary in adapting the use of new insecticides for control and the improvement of methods of application, including the use of aircraft.

JAPANESE BEETLE CONTROL



U.S. DEPARTMENT OF AGRICULTURE

KHAPRA BEETLE

The discovery of a khapra beetle(Trogoderma granarium)infestation in a warehouse at Alpaugh, Tulare County, California, on November 10, 1953, represented the first known occurrence of this insect in the Western Hemisphere. There is evidence that the beetle may have been present in a warehouse at Fresno, California, as early as 1946. Used burlap bags taken from the Fresno warehouse to Alpaugh apparently account for the infestation that later was found there. It was found infesting stored grain in Phoenix, Arizona, January of 1954, and in April of that year specimens were recovered on sacked seed in New Mexico. Also, in 1954, khapra beetles were collected from a warehouse in Mexicali, Baja California, Mexico. Since the initial discovery of khapra beetle in the United States, infestations have been found on 87 properties in Arizona, 257 in California, 4 in New Mexico, and 19 in Baja California.

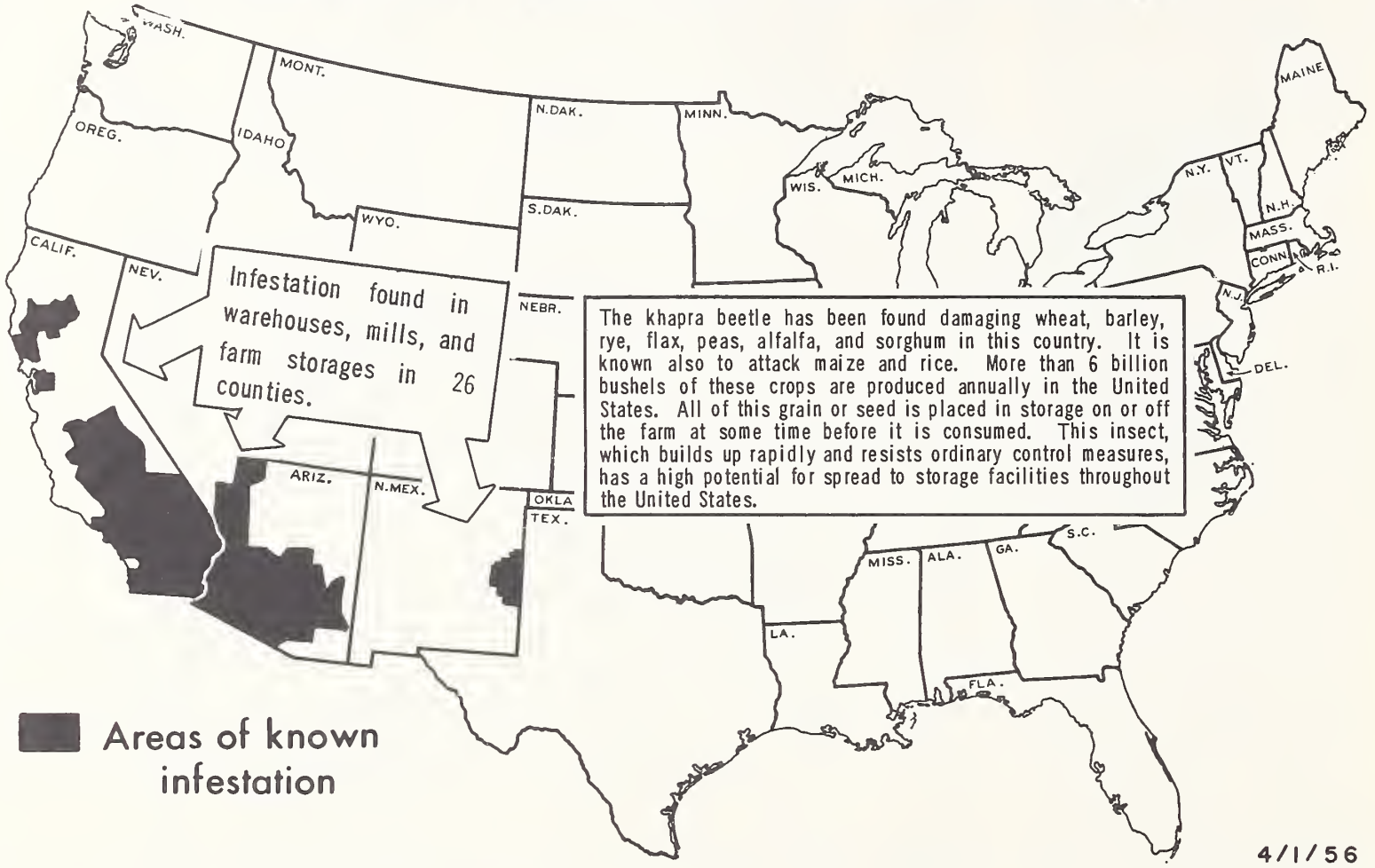
The khapra beetle, which was first described in 1898, is a native of India, Ceylon, and Malaya, where it is considered the most serious of all storage pests. It is now known to occur in England, Australia, Korea, Germany, Egypt, and other European, African, and Asiatic countries.

Nature of Pest: The life cycle of the khapra beetle is completed in from 35 to 100 days, depending on temperature. Temperatures from 85 to 90° F, are optimum, yet the larvae have been known to withstand temperatures of 14° F., for short periods of time, and the upper level is considered to be about 115° F. There are five molts in the development of the larvae, and the cast skin is shed following each molt. The female lays an average of 120 eggs. The adults live but a short time and apparently do not feed. Grain damage, depending upon existing conditions, varies from 5 to 30 percent, and damage up to even 75 percent has been reported. In this country it has been found in oats, wheat, alfalfa seed, castor beans, and cottonseed. Preferred processed materials include cornmeal, rolled oats, flour, breakfast cereals, crackers, dog biscuits, powdered milk, raisins, and nut meats. Bulk grain under extended storage presents the most favorable conditions for beetle multiplication and subsequent damage.

Quarantine and Control: Because of the habit of the larvae of concealing themselves in crevices and cracks and living for extended periods without food, nothing short of a penetrating fumigant provides effective eradication. Methyl bromide applied to structures under gastight tarpaulins is recommended for the fumigation. It is applied at the rate of 5 pounds per 1,000 cubic feet; the exposure period is 48 hours, and concentrations of gas in the building are to remain at 32 ounces or above for at least 24 hours of the period.

Of the 350 properties found infested in the United States, involving approximately 91 million cubic feet, 180 premises having a volume of 64 million cubic feet have been fumigated and released from quarantine.

KHAPRA BEETLE ERADICATION



The khapra beetle has been found damaging wheat, barley, rye, flax, peas, alfalfa, and sorghum in this country. It is known also to attack maize and rice. More than 6 billion bushels of these crops are produced annually in the United States. All of this grain or seed is placed in storage on or off the farm at some time before it is consumed. This insect, which builds up rapidly and resists ordinary control measures, has a high potential for spread to storage facilities throughout the United States.

4/1/56

MEXICAN FRUIT FLY

History: The Mexican fruit fly, a native of northeastern Mexico, appeared in southern Texas in 1927. In 1954 it was found close to the Arizona and California borders and one specimen was trapped in San Diego County, California.

Nature of Pest: The Mexican fruit fly attacks citrus and a variety of other fruits. The female fly pierces the rind of the fruit and lays numerous eggs beneath. When the eggs hatch, the larvae feed until the fruit falls to the ground. The larvae, when full grown, leave the fruit and go into the ground to pupate, followed soon by the emergence of adults. Three to five generations may occur in a year.

Each year the insect migrates from northeastern Mexico into Texas during the fall. Crop damage in Texas has been light because of the absence of a wild host, lack of the succession of hosts, and high temperatures which prevent carryover and build-up from one season to another.

Quarantine and Control: If the Mexican fruit fly should become established in northwestern Mexico and southern California, it might cause greater losses than occur in Texas because of the climate, succession of host, and wide variety of year-round host fruits.

The Mexican fruit fly control program has three objectives: (1) Enforcement of Federal Quarantine #64 to prevent the spread of the pest from the infested area in southern Texas to other fruit-growing sections, (2) cooperation in California and northwestern Mexico in a campaign to eradicate the light infestation near the international border, and (3) cooperation with the Mexican Department of Agriculture in enforcement of the Mexican quarantine in the northern part of Baja California and Sonora.

In the Mexican fruit fly control work, the Branch is cooperating in the following phases of the program: Enforcement of quarantine regulations, inspection of groves and trapping for detecting infestations and treatment of infested fruit moving from the regulated area.

A program to eradicate an incipient infestation in northern Baja California by the application of spray to all host plants in the area is being conducted cooperatively with the Mexican Department of Agriculture. Its success seems assured as only two adult flies were trapped during 1955 and none during 1956. Sprays have been applied where the single fly was trapped in southern California in 1954.

The Mexican Fruit Fly Control Program is conducted cooperatively by the Plant Pest Control Branch, Texas Department of Agriculture, the Arizona and California State and County Departments of Agriculture, and the Department of Agriculture of Mexico.

MEXICAN FRUIT FLY CONTROL

(1) The citrus industry of Texas is making a steady "comeback" from the disastrous freeze of 1951. Production for 1954-55 was approximately 4 million boxes. 1956-57 production should reach 10 to 15 million boxes.

4/1/56

PEACH MOSAIC DISEASE

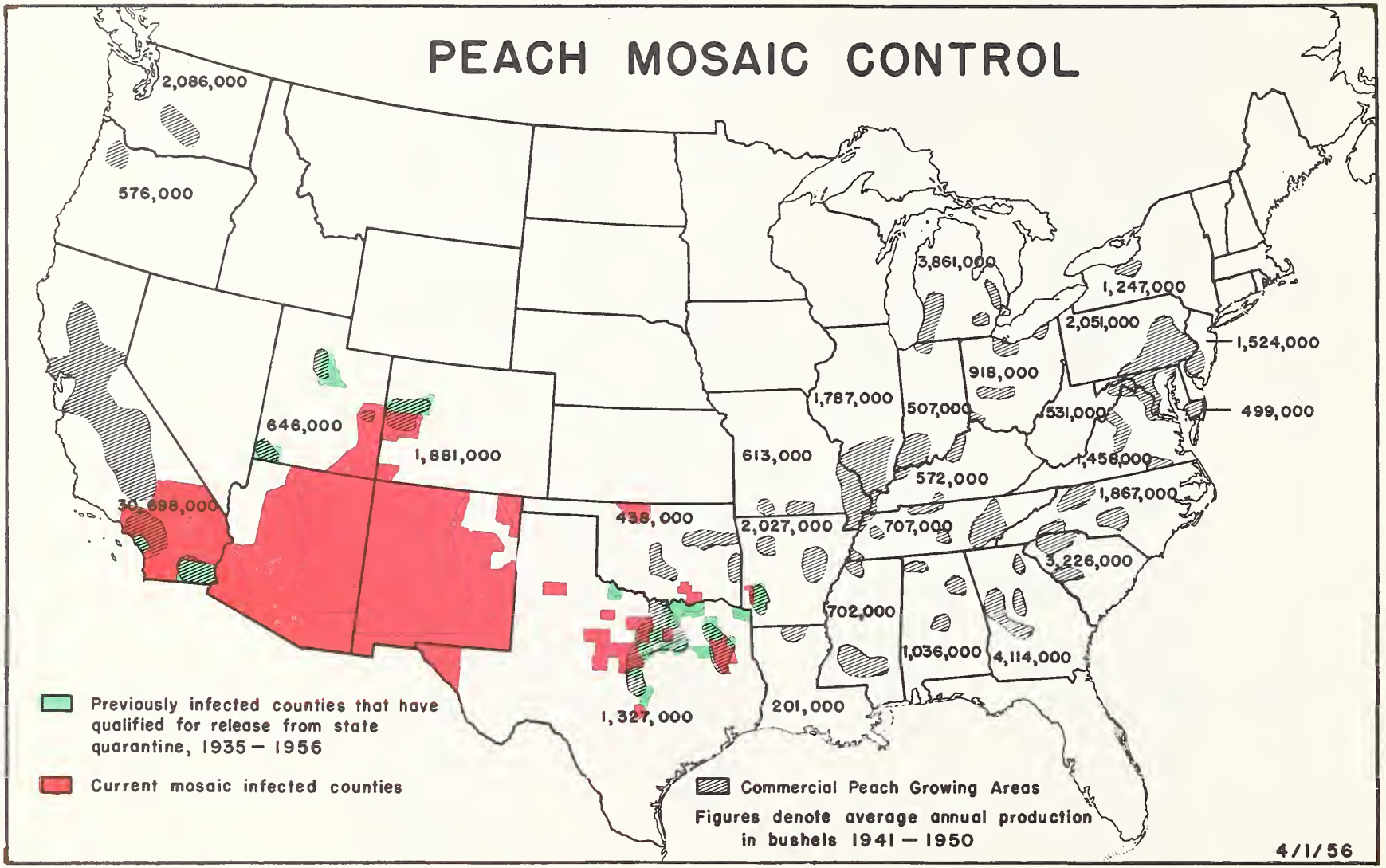
History: Peach mosaic is a serious disease of peach, first recognized in 1931 in Texas and now known to be present in the States of Arizona, Arkansas, California, Colorado, New Mexico, Oklahoma, Utah and Texas.

Nature of Disease: The disease is caused by a virus which is transmitted from diseased to healthy trees by a microscopic eriophyid mite. In the spring newly formed leaves on affected trees become mottled with yellow and short internodes with profuse branching are produced. The surface of the fruit in many varieties is irregular and bumpy. The commercial value of an infected planting may be destroyed within 3 to 6 years. At one time 30,000 infected trees were known to be present in each of the States of California and Colorado. In addition to peaches, the disease affects almond, apricot, nectarine and plum.

Quarantine and Control Program: The objectives of this program are: (1) preventing further spread of the disease by adequate nursery and budwood inspection and uniform State quarantine enforcement; (2) assistance to growers in reducing of the incidence of the disease in infected commercial areas and (3) conducting surveys for the disease in areas where it is not known to occur. The States, the Federal government and industry cooperate in this program.

Control is effected by the prompt removal of infected trees. There has been a reduction in peach mosaic incidence over the total area from a high of 4.16 percent in 1935 to 0.24 percent in 1955. Due to quarantine enforcement the establishment of new areas of infection through the shipment of nursery stock and budwood has been prevented.

The mosaic control is considered as a holding program and will continue as such until resistant varieties of peach or improved control techniques are developed. An important need is for the development of a control for the mite vector. Research on the control of the vector of peach mosaic is being done by the Entomology Research Branch, Agricultural Research Service, Riverside, California. Phytopathological studies are also being carried on at Riverside, California, by the Horticultural Crops Research Branch, Agricultural Research Service. State research agencies in affected areas are cooperating. These studies include testing tolerant or resistant peach varieties to the several strains of the peach mosaic virus.


PEACH MOSAIC CONTROL
2,086,000
576,000
646,000
1,881,000
30,698,000
438,000
1,327,000
613,000
2,027,000
201,000
3,861,000
1,787,000
507,000
572,000
707,000
1,036,000
702,000
1,247,000
2,051,000
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531,000
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1,867,000
3,226,000
4,114,000
1,524,000
499,000
Previously infected counties that have qualified for release from state quarantine, 1935 – 1956
Current mosaic infected counties
Commercial Peach Growing Areas
Figures denote average annual production in bushels 1941 – 1950
4/1/56

PESTICIDE REGULATORY ACTIVITIES

Objective: The objective of the Pesticide Regulation Section's program is to carry out the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act of 1947. The intention of this Act is to assure the general public that commercial pesticides shall be effective for the purposes for which they are sold, and that they shall not cause injury to the user or to those who may eat treated products, as well as to assure uniformity of regulation. This is being accomplished by requiring correctness of labeling as a prerequisite to registration under the Federal law and by examining samples and taking legal action, when appropriate, against manufacturers shipping improperly labeled or ineffective pesticides in interstate commerce. Close cooperation with the States is maintained in carrying out these functions.

Effectiveness: Since this legislation became operative more than 41,000 products have been Federally registered. During 1955, 4,269 new products were registered; labels were amended for 3,728 additional products, and 3,305 distributors' labels were also registered. In the registration program, which requires a determination of the safety and effectiveness of each use claimed for a pesticide, such determinations are made along general lines at the Federal level and information concerning them sent to the States. The States adapt them to their special conditions, closely cooperating with the Plant Pest Control Branch on matters of policy. Federal investigators obtain pesticide samples from interstate shipments; these are examined, and when violation occurs legal action may be taken. A cooperative agreement has been accepted by a number of States by which we are furnished results of their analyses to be used as the basis for possible Federal action. These efforts are resulting in better products and labeling than would otherwise be possible but leave much to be desired inasmuch as there are still some States which have no pesticide regulatory laws, and many of those which do have such laws are not in a position to cooperate due to limited facilities.

Methods Development: Performance tests carried out at both Federal and State levels and the development of methods of analysis are necessary adjuncts to the regulation of many new pesticides. Such activities, however, must be kept to a minimum because of the immediate necessities of other functions of the administration of the law.

Interdepartmental Cooperation: Public Law 518, the Pesticides Amendment to the Federal Food, Drug, and Cosmetic Act, was enacted July 22, 1954. The Food and Drug Administration of the Department of Health, Education, and welfare was made responsible for the enforcement of the law, which provides that residues of pesticides on raw agricultural commodities moving in interstate commerce shall not exceed tolerances established by that agency. In connection with the administration of the law, the Secretary of Agriculture is required to certify to the Secretary of Health, Education, and Welfare that pesticides for which residue tolerances under the provisions of the law are requested are useful for the purposes named in the petition and to render an opinion as to the extent of the residues likely to result from the proposed uses. These duties and responsibilities were delegated by the Secretary of Agriculture to

the Pesticide Regulation Section. During 1955, 54 petitions for pesticide residue tolerances were presented to the Food and Drug Administration and referred to the Section for certifications of usefulness and opinions on residues likely to result; 43 such certifications and opinions were prepared by the Section and forwarded to the Department of Health, Education, and Welfare.

PHONY PEACH DISEASE

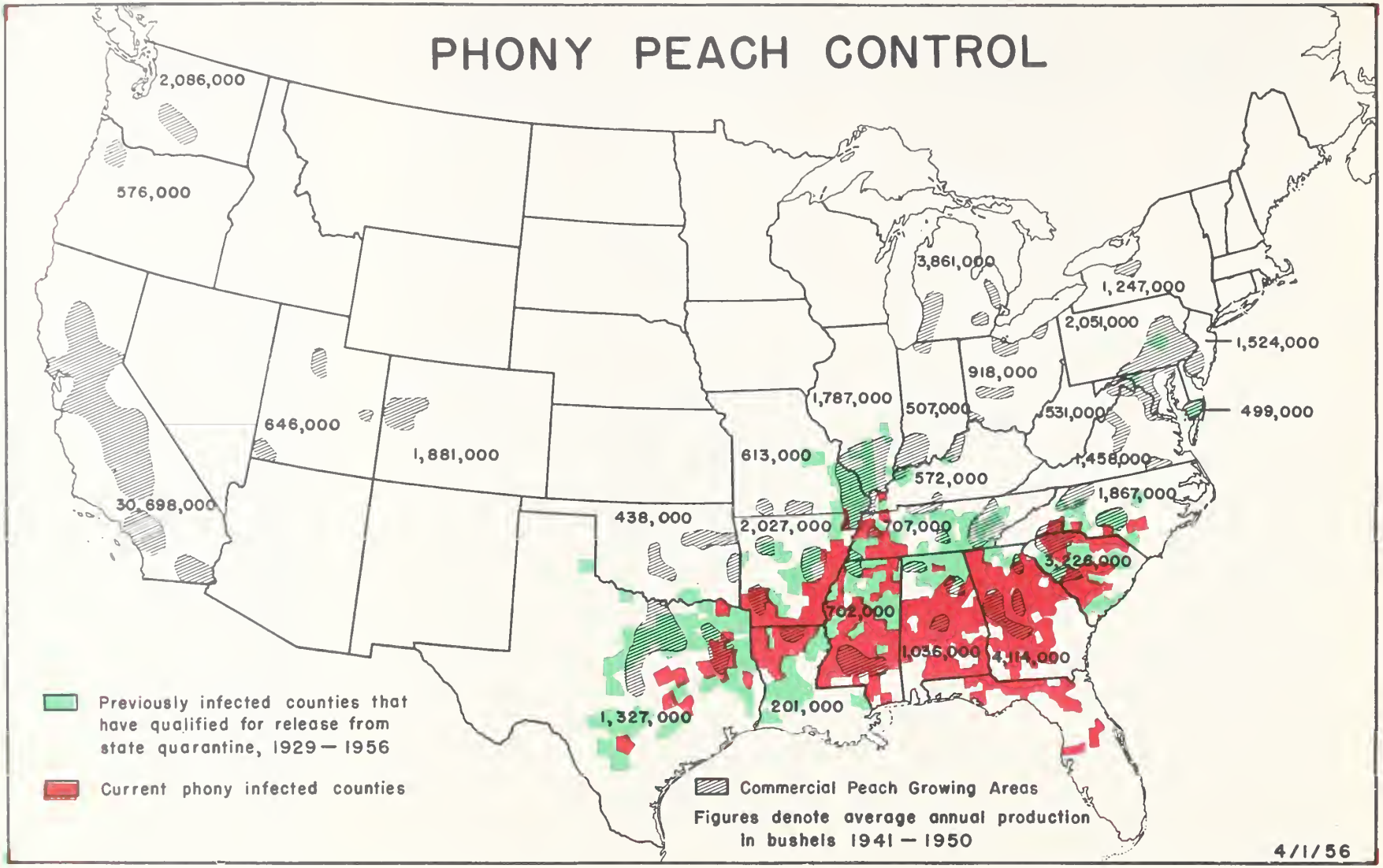
History: Phony peach disease was first observed at Marshallville, Georgia, about 1885. The disease is thought to be native to the United States. It has been found in 17 States located east of and including Texas but it is serious or potentially serious only where the range of the insect vectors overlaps areas of peach production. It is considered a serious threat to commercial peach production in Alabama, Georgia, South Carolina and in the southeastern parts of Arkansas and Missouri, eastern Texas and northern Louisiana.

Nature of Disease: Phony peach disease is caused by a virus which is known to be transmitted by several species of leafhoppers, one of which appears to be much more important in disease transmission than the others. The disease affects not only peach but apricot, almond, nectarine, and plum. Trees are not killed outright but the fruit becomes progressively smaller each year until production becomes unprofitable. The disease may affect a tree for 18 months before detection is possible; therefore it is likely that some spread occurs before the diseased trees can be recognized and removed. Discovery that the disease is endemic in wild plums has led to efforts to eliminate plums in the vicinity of peach orchards in order to aid in control.

Quarantine and Control: Objectives of the control program are (1) To conduct surveys in wild and cultivated hosts to define areas of infection; (2) to prevent spread of the disease into uninfected areas; (3) to assist the grower by inspecting his orchards in order that infected trees may be removed and the orchard maintained as a profitable planting. The trees are removed by the grower. Since 1929 more than three million trees have been destroyed by growers because of the disease, and the loss would have been even greater without the organized control program. A Federal quarantine regulating the movement of peach nursery stock was in effect from 1929 to 1934, but it was rescinded and regulation continued under uniform State quarantines established by the infected States.

Control programs are being conducted in commercial fruit-growing areas of Alabama, Arkansas, Georgia, Louisiana, Missouri, South Carolina, and Texas. As a measure of the effectiveness of the present program, there is no long-range spread of the disease through nursery stock and control in commercial orchards is effective where present procedures are followed carefully. There has been a progressive decline in infection for the past three years.

Coordination of the program is carried out by the Plant Pest Control Branch which also arranges meetings and distributes information through the Extension Service. State agencies provide the necessary local authority for inspection and tree removal, furnish a portion of the inspectors and labor, and enforce quarantines and regulations.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Previously infected counties that have qualified for release from state quarantine, 1929 — 1956
Current phony infected counties
Commercial Peach Growing Areas
Figures denote average annual production in bushels 1941 — 1950
4/1/56

PINK BOLLWORM

Pink bollworm, an insect native to India, was introduced from Egypt into Mexico in 1911. The first infestation in the United States was found at Hearne, Texas, in 1917 from large shipments of infested cottonseed from Mexico. The insect now occurs throughout Texas and Oklahoma, the cotton-producing areas of New Mexico, and in parts of Arizona, Arkansas, and Louisiana.

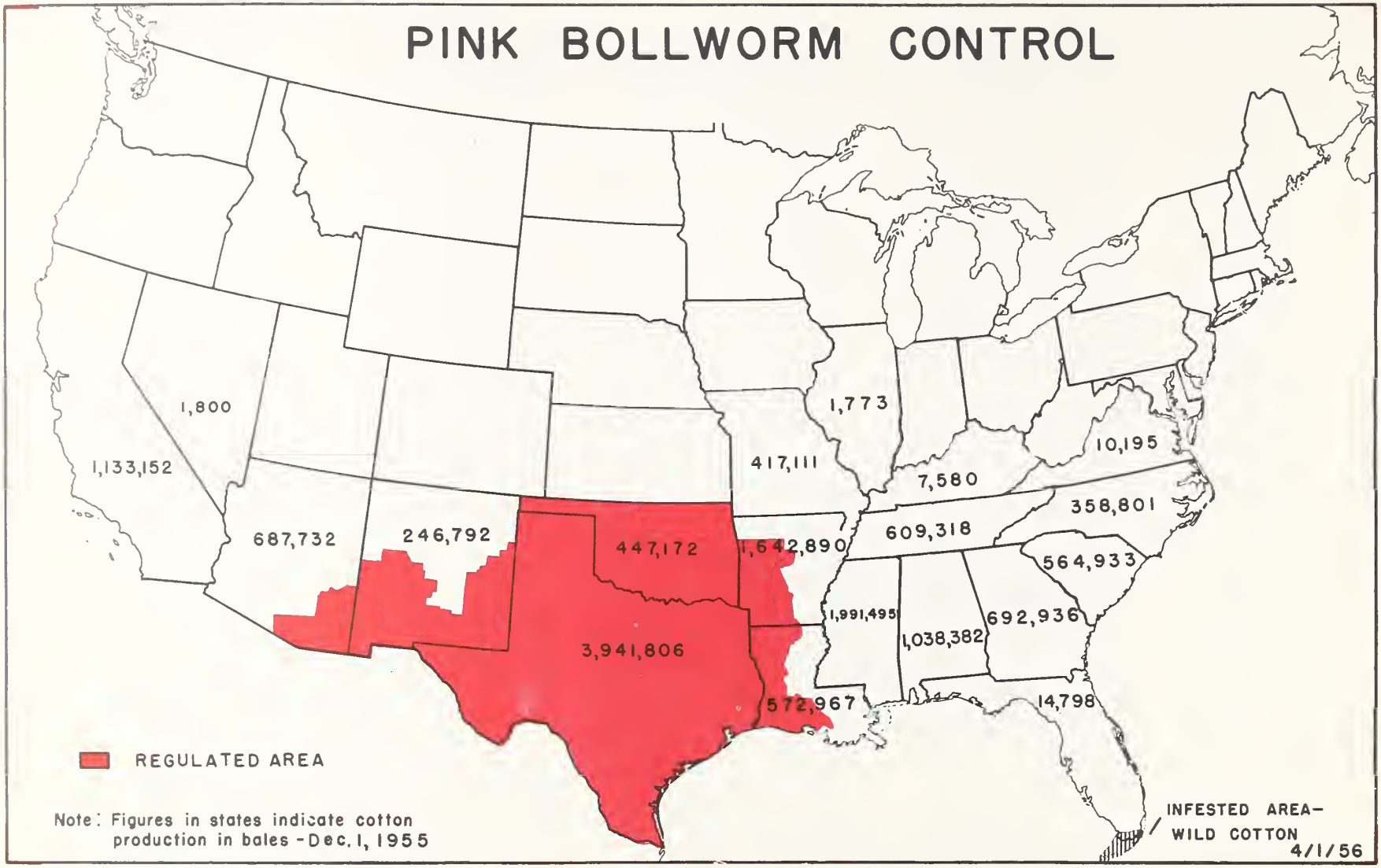
Nature of the Insect: The adults of the pink bollworm are small, grayish-brown moths. Each female lays 100-200 eggs on cotton plants near the base of the squares or bolls. Eggs of the first generation are laid on squares and the worm feeds in the square and is fully grown by the time the bloom appears. Green bolls are preferred for egg laying and feeding. The eggs hatch in 4-5 days, and the small, pinkish-white larva enters the boll and feeds from 10-14 days. The complete life cycle in the summertime requires 25-30 days. Most of the larvae overwinter in crop residue left in the fields after picking is completed. In addition to cotton, the pink bollworm also attacks okra and a number of other malvaceous plants.

As the pink bollworm feeds inside the green cotton boll it moves from seed to seed, cutting and staining the immature fibers and eating out the seed contents. This results in loss of weight of the seed and lowers the value of the oil. Lint from such damaged bolls is stained, short, and of low grade. Molds may completely ruin bolls in which pink bollworms have left exit holes. Although severe losses in individual fields or small areas have occurred in Texas since the late twenties, the over-all damage has been extremely light. However, unfavorable weather conditions in south Texas interfered with the cultural control program in 1951 and resulted in a large carryover of the pink bollworm and a very heavy infestation in 1952. Damage was estimated at 30 million dollars.

Quarantine and Control: The objective of the pink bollworm control program in the United States and Mexico is eradication of isolated infestations and suppression of infestations in areas where eradication is not practicable; thereby preventing or retarding spread by moth flights. The current operations include: Annual surveys throughout the cotton belt to locate new infestations and to provide a basis for regulatory and control actions; enforcement of regulations to prevent spread; operation of traffic inspection stations to prevent artificial spread of live pink bollworms; cooperation with the States concerned in suppressive programs to prevent natural spread.

The Branch cooperates with: Entomology Research and Agricultural Engineering Research, ARS; state regulatory officials; Extension Service; national, state and local trade groups; pink bollworm committees; growers and processors of cotton; and the Department of Agriculture and trade groups of Mexico. Since the pink bollworm was first introduced into the United States in 1917, many isolated infestations in Arizona, Texas, Louisiana, Georgia, and Florida have been eradicated.

PINK BOLLWORM CONTROL



Note: Figures in states indicate cotton production in bales - Dec. 1, 1955

U.S DEPARTMENT OF AGRICULTURE

SOYBEAN NEMATODE

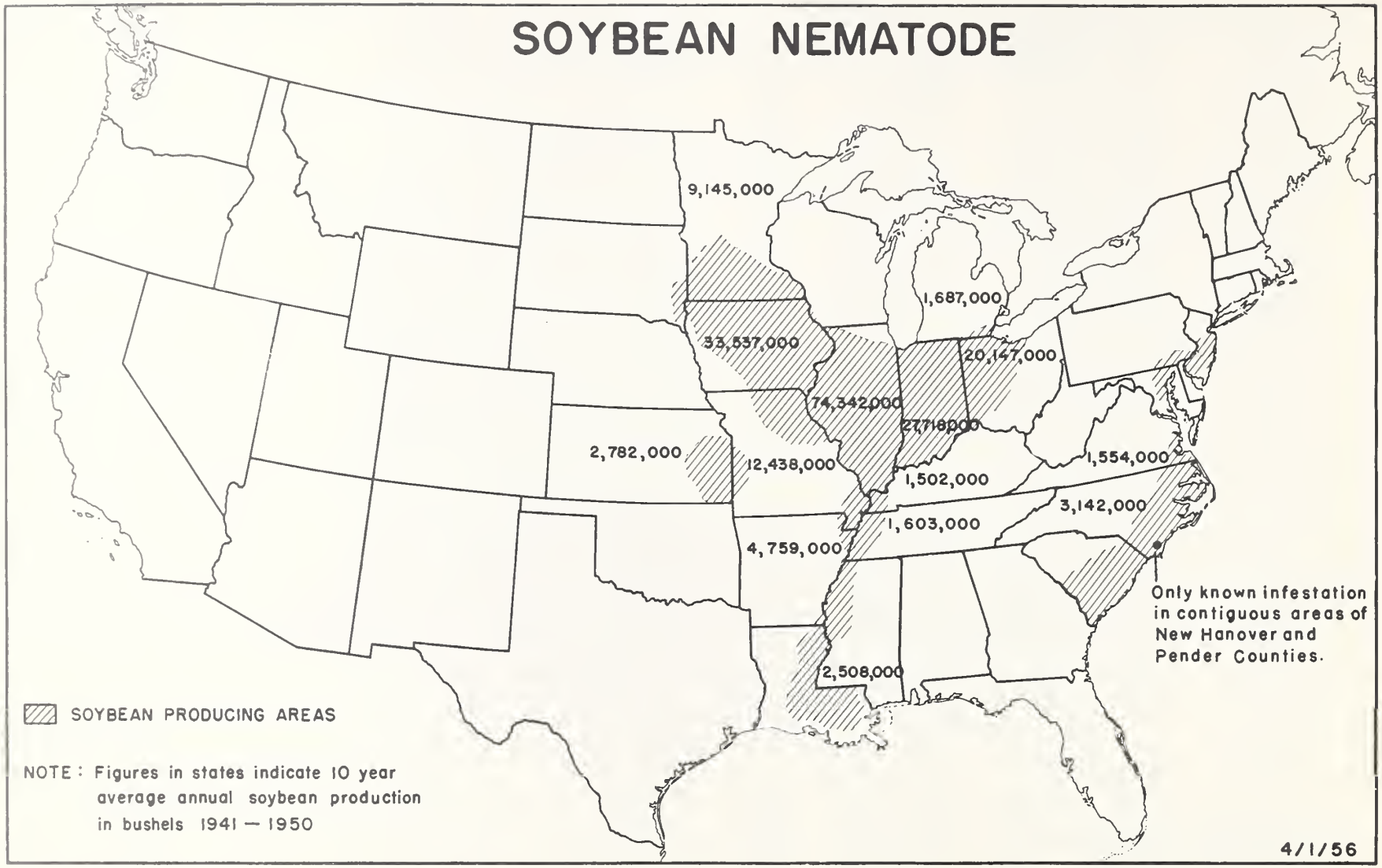
History: The soybean cyst nematode occurs in Japan and China (Manchuria). It was discovered in this country in Castle Hayne, New Hanover County, North Carolina, in 1954, and subsequent surveys indicate that a total of 1,054 acres are infested in New Hanover and adjoining Pender County.

Nature of the Pest: The nematode is a microscopic round worm which penetrates and feeds inside rootlets. Later, females emerge but remain attached to the rootlet. A cyst is formed containing about 400 eggs. When the eggs hatch, the larvae emerge from the cyst and continue the cycle. A life cycle is completed in about three weeks and five generations may be produced in one crop of soybeans. Soybean and Adzuki bean are highly susceptible hosts, while snap beans are less susceptible and common vetch and annual lespedeza may be susceptible.

Severely attacked soybean plants become yellow and stunted. Lightly-infested plants show few symptoms. Severe infestations may lower yields to a point where crops might not be worth harvesting. Observations made in North Carolina indicate that this pest, if allowed to spread, could become a serious hazard to commercial soybean production throughout the United States.

Objectives: The purpose of the program is to define infested areas; to survey for presence of the nematode in other soybean areas; and to prevent further spread.

Quarantine and Control: In 1955, soybean fields within a 50-mile radius of infested areas were examined and soil samples were collected from suspicious areas. Since the infestation was first found in a bulb-growing area, similar areas where bulbs and soybeans are grown in rotation on the same land were soil-sampled in North Carolina and Virginia. No infestations were found other than the 1,000 acres in New Hanover County and 54 acres in Pender County, North Carolina. In the infested area farming practices are being observed to determine how the soybean cyst nematode is spread. A careful study has been made of the regulatory problems involved. The Department has assisted the States in spot surveys throughout the 31 commercial soybean-producing states to determine if the nematode might be the cause of any unexplained damage to soybeans. None was found. The North Carolina State Department of Agriculture is establishing a quarantine to be effective in the spring of 1956



U.S. DEPARTMENT OF AGRICULTURE

SWEETPOTATO WEEVIL

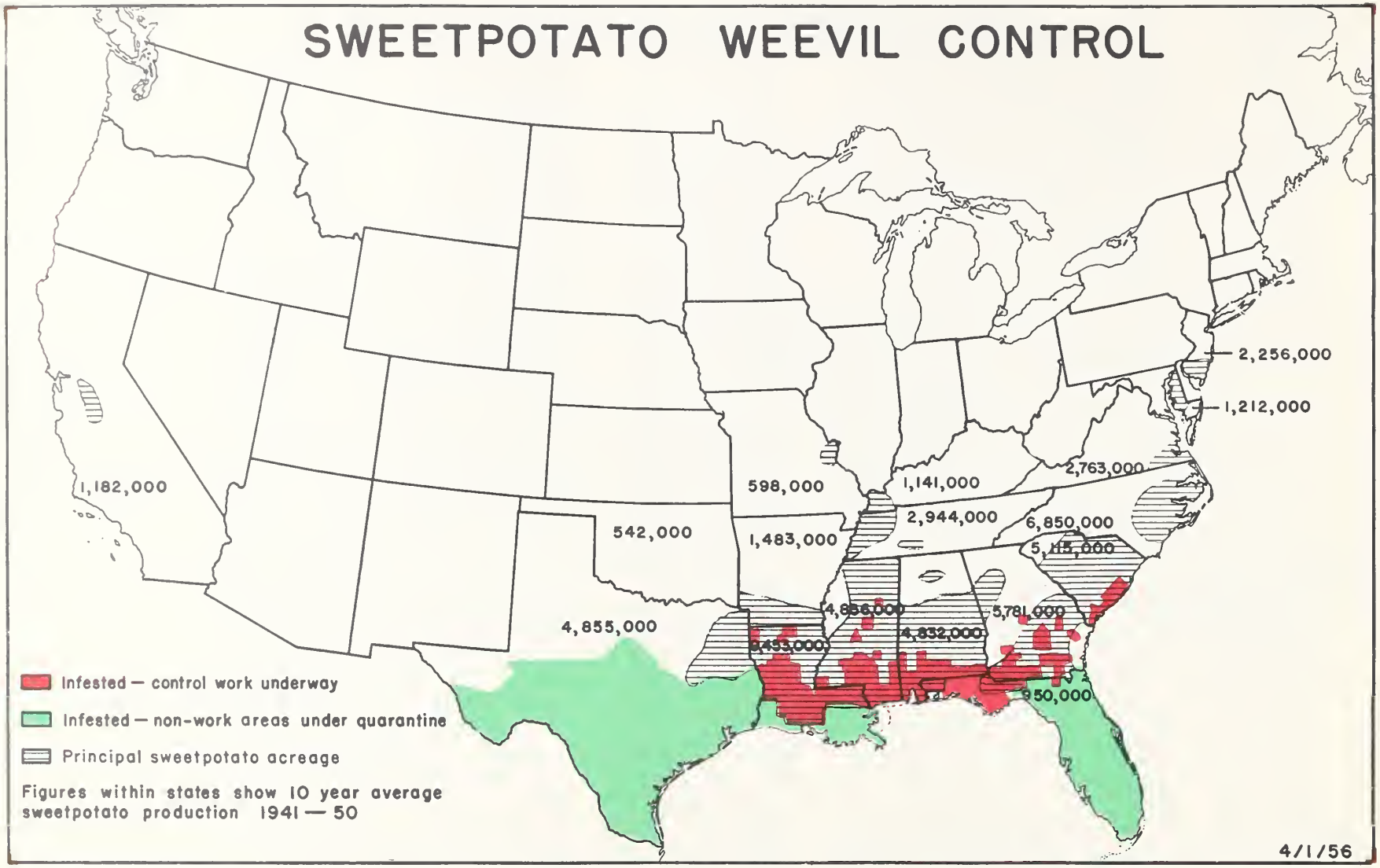
History: The sweetpotato weevil was first recorded in Louisiana in 1875 and shortly thereafter in Florida and Texas - indicating that it was introduced through several Gulf Coast ports at about the same time. It came from Asia. At present it is known to occur in Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina and Texas.

Nature of Pest: The egg of the beetle is minute, yellowish-white and oval in shape. The larva is a white, legless grub with a brown head and when full-grown measures about 1/4 of an inch in length. The adult is a snout beetle, ant-like in appearance and about the same length as the full-grown grub. It is dark metallic blue on the head, snout and wing covers, with prothorax and legs of reddish-orange. Adults and grubs feed on sweetpotatoes in the field and in storage. Adults prefer the tuberous root but will feed on leaves and vines. The grubs cause the principal damage by burrowing through the potato, leaving it with a bitter taste and unfit for human, and sometimes for animal, consumption. Growers frequently have losses ranging from 20 to 50 percent of the crop in the field and an additional damage in storage. The weevil is so abundant in some sections that sweetpotatoes cannot be grown profitably. An estimated three million dollars loss from the insect has occurred in a single year in Louisiana.

Quarantine and Control: The objectives of the program are (1) to eradicate the weevil in outlying infestations; (2) to suppress populations in areas of heavy commercial production and (3) to prevent its spread into uninfested areas. These objectives are carried out by making surveys to locate outlying infestations, by establishing non-sweetpotato growing areas, by conducting a cooperative control program in areas of heavy commercial production, and by treating sweetpotatoes shipped from infested areas.

Alabama, Georgia, Mississippi and Texas established sweetpotato weevil control programs in 1937, Louisiana in 1944 and South Carolina in 1946. The control program includes planning and direction, technical assistance, demonstrations, surveys, eradication measures, suppressive measures in areas of heavy commercial production and quarantine enforcement. For the past several years, cooperating States have contributed about 75 percent of program costs. State funds have averaged more than 65 percent of the total funds expended since the program started.

The work program has eliminated the sweetpotato weevil from more than 16,000 farm units, including 32 counties in cooperating States and it has reduced the economic losses in some years as much as $2,750,000. Recent approval of new insecticides for control of the weevil will permit relaxing planting restrictions in many areas and will make it possible for the grower to control the weevil on his own property.



U.S. DEPARTMENT OF AGRICULTURE

WHITE-FRINGED BEETLE

The white-fringed beetle was first found in the United States in northwest Florida in 1936. It was probably introduced from South America where it occurs in Argentine, Brazil, Chile and Uraguay. Now it infests about 500,000 acres in 188 counties in Alabama, Florida, Georgia, Louisiana, Mississippi, New Jersey, North Carolina, South Carolina and Tennessee.

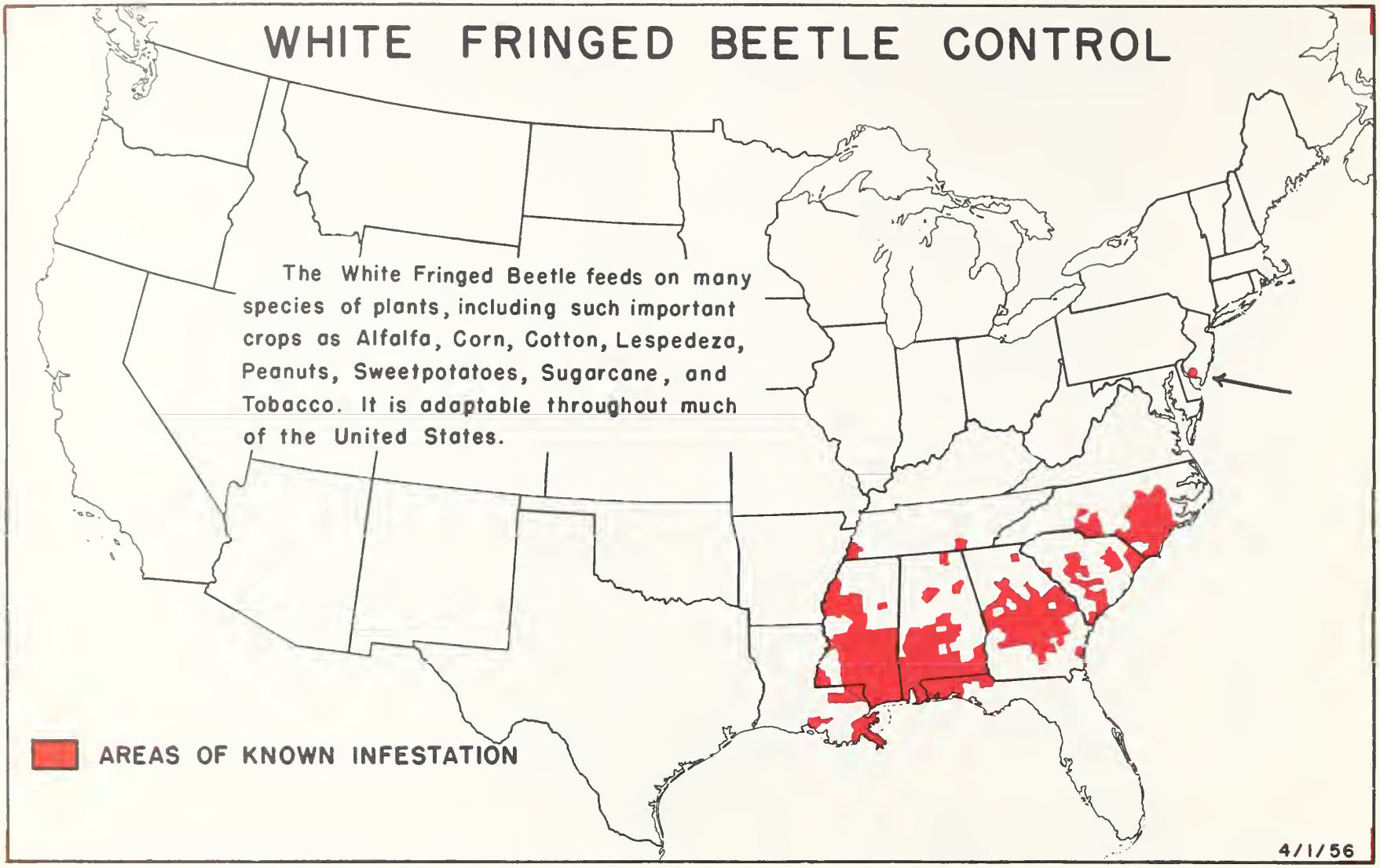
Nature of the Insect: All white -fringed beetles are wingless females. Emergence of the beetles from the soil begins in late May and continues into September and October. A few days after emergence the beetles begin laying eggs, cementing them in small masses to plant stems, sticks, debris or soil particles. Lumber, building materials, cottonbolls, seed cotton, velvetbean pods, farm implements and other such articles in contact with the soil may have eggs attached to them. The grubs that develop from the eggs feed on roots and underground stems of young plants in the spring. They gnaw the taproot and bottom part of the stem, but feed very little on laterals. Grubs and adults have been observed feeding on over 385 species of plants, important ones of which are cotton, corn, soybeans, velvetbeans, peanuts, potatoes, sweetpotatoes, tobacco, strawberries, kudzu, lespedeza, lupine and oats, and on the roots of peaches, pecans, tung, and willow.

In some fields up to 70 percent of the plants have been killed in areas ranging from a few square yards to large acreages. Even light populations can seriously damage truck crops. The threat of the pest is emphasized by the great variety of plants attacked, which include almost every major crop plant of the nation.

Quarantine and Control: Objectives of the program fall into three categories: (1) Surveys in regulated areas to determine the degree of infestation on which regulatory and control requirements are based; (2) surveys in uninfested areas; (3) enforcement of Federal and State quarantines; (4) suppression and eradication of infestations to prevent spread of the pest and to assist the grower in preventing losses.

Various emergency methods such as ditching, trap crops and flame throwers were used originally, followed by the use of calcium arsenate and cryolite as foliage applications. DDT is now used both as soil and foliage treatments and dieldrin, chlordane and heptachlor also have been approved, giving rise to the possibility of eradication of the beetle in a given infested area through their effectiveness. Of the approximately 500,000 acres classed as infested in 1955, resurveys showed that only four percent of the acreage supported heavy infestations and no specimens were found on 34 percent, the remainder had light to moderate infestations. Of 23,000 acres infested in Louisiana, no specimens were found on 19,000 acres and only five acres had heavy infestation. Effectiveness of treatment is demonstrated by the fact that infestations have been kept at a low level, spread of the beetle has been retarded and extensive crop damage prevented.

WHITE FRINGED BEETLE CONTROL



U.S. DEPARTMENT OF AGRICULTURE

WILD COTTON ERADICATION

Wild cotton plants and dooryard cotton in Florida provide hosts for harboring the pink bollworm, a serious migratory pest of cotton and okra. Pink bollworm was found in wild cotton and ornamental or dooryard cotton plants of southern Florida in 1932.

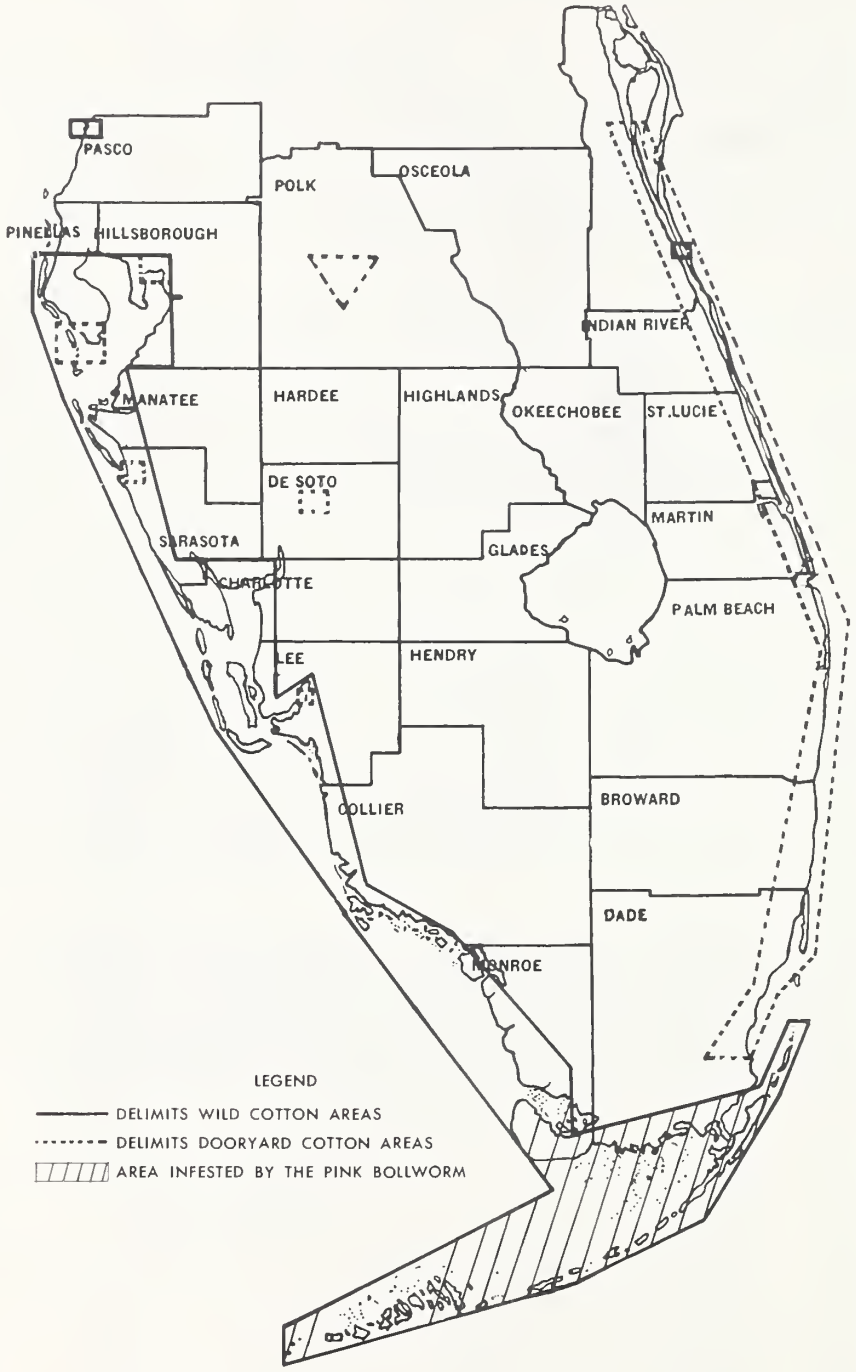
Nature of Problem: Wild cotton and dooryard cotton in southern Florida were considered to be the source of pink bollworm infestations in commercial cotton in northern Florida and southern Georgia during 1933. Rigid quarantine regulations in those cotton-growing areas reduced considerably the danger to the Southeastern States by 1937. Although cotton is not grown commercially in southern Florida, its widespread occurrence as an ornamental and as a wild plant provides hosts for the pink bollworm.

Objective and Status of Program: The objective of the wild cotton eradication program is eventually to eradicate pink bollworm from southern Florida. By creating a host-free period during the dry season of the year, it is possible to hold the degree of infestation to a minimum and so decrease the possibility of reinfestation of commercial cotton in the Southeastern States. Originally, infestations in wild cotton were very high on the mainland of Dade and Monroe Counties and in the outlying keys. As the removal of wild cotton plants progressed, infestations of pink bollworm dropped to less than one percent from a high of over 30 percent in some areas. When no funds for wild cotton work were appropriated in 1947-48, infestations of pink bollworm built up to as high as 70 percent in some of the mainland keys in Monroe County by 1949. Current operations involve searching out previously known cotton colonies and destroying all mature plants. The fruit is carefully collected and destroyed to prevent new growth from seed and at the same time to destroy pink bollworm present in the bolls. Of over 900 known cotton colonies, over 400 can be reached only by boat through very shallow waters. Plants are destroyed by pulling or by use of sodium arsenite. To be effectively controlled, cotton colonies must be cleaned out twice per season.

The infestation of pink bollworm in wild cotton in 1954-55 season was confined to eight cotton colonies with only 43 specimens found in the extreme southern part of the wild cotton growing area. The problem ahead is to keep reducing the number of wild cotton and dooryard plants and eventually to eliminate them from southern Florida.

WILD AND DOORYARD COTTON ERADICATION

SOUTH FLORIDA



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